

**A STUDY OF THE EXTENT TO WHICH SENIOR
SECONDARY SCHOOL STUDENTS PRACTISE
DISSEMINATING ENVIRONMENTAL EDUCATION
TO THE SURROUNDING COMMUNITY:
WITH PARTICULAR REFERENCE TO GRADE
ELEVEN STUDENTS IN EAST WELLEGA ZONE**

**A Thesis Submitted to the
School of Graduate Studies
Addis Ababa University**

**In Partial Fulfilment of the Requirements
for the Degree of Master of Arts in
Curriculum and Instruction**

**By
DESALEGN FUFA**

JUNE 1998

ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES

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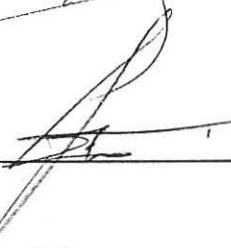
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ACKNOWLEDGMENT

I am highly indebted to my advisor, Dr. Marew Zewudie for all his invaluable advices and encouragements through out my thesis work.

My thanks also go to Ato Akililu Dalelo and Moges Worku for their valuable comments and material supply.

The professional supports and encouragements of my colleagues-Teklu Gemechu, Aseffa Tafa and Fetene Ragassa also deserve appreciation. On the other hand, Fekadu Chernet, Bekele Fanta and Getachew Qinati are duely acknowledged for their assistance in the process of data collection.

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ABBREVIATIONS USED IN THE STUDY

E.E.S	Environmental Education Series
IUCN	International Union for Conservation of Nature and Natural Resources
NEPA	National Environmental Protection Authority
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNEP	United Nations Environment Program
PRB	Population Reference Bureau
WRI	World Resource Institute
MOE	Ministry of Education
MOA	Ministry of Agriculture
WWF	World Wildlife Fund
UNESCAP	United Nations Economic and Social Commission for Asia and Pacific
NGO	Non- Governmental Organization
FAO	Food and Agricultural Organization
EWNHS	Ethiopian Wildlife and Natural History Society
IEEP	International Environmental Education Program
OEB	Oromia Education Bureau
E.E.C.M	Environmental Education Club Members
N.C.M	Non- Club Members
U.N.D.P	United Nations Development Program

ABSTRACT

The purpose of this study was to investigate the the extent to which senior secondary school students, grade eleven students in particular, of East Wellega zone, disseminate environmental education to the surrounding community. In doing so, an attempt was made to see the students' awareness, attitude and practice regarding environmental concerns. The subjects included 200 students from two senior secondary schools in the zone, their respective parents and 23 teachers. An awareness test, attitude inventory and rating scale questionnaires were administered to the students to investigate their awareness of and attitude toward environmental concerns, and factors hindering the dissemination of environmental education to the community. Moreover, a questionnaire was administered to the teachers and an interview was conducted with the parents to examine students' practices in disseminating environmental education. The data was, then, analyzed using percentage, class interval, t-test and correlation matrix. The results of the study revealed that the students had an awareness of basic environmental education issues and also had favourable attitude toward the conservation of resources. Nonetheless, their practices in disseminating environmental education to the community was found to be relatively much less. On the other hand, a comparison made between environmental education club members and the non-club members indicated a better standing of the club members in their awareness, attitude and practices. The comparison between urban and rural students also revealed more favourable attitude, and practices with the latter. Based on these findings recommendations were suggested.

CHAPTER ONE

1. INTRODUCTION

1.1 Background of the Problem

Human beings have been dependent on and moulders of their environment from the time immemorial. The primitive men were almost entirely dependent on nature's gift and their impact on the environment was insignificant. With the improvement of the means of production, men's exploitation of their environment grew. A drastic change came in to being with the industrial revolution of the mid 18th century which brought about progress in industries contributing to the advancement in agricultural sector, thereby, increasing food production (Hertzler, 1956). Moreover, the innovation of medicines enabled men to overcome, many of the otherwise epidemic diseases that had curtailed the growth of human population for a long time. This contributed to the growth of world population with corresponding growth in economic activities which put natural resources under great pressure (World Resource Institute (WRI), 1990; 1992). For instance, a rapid population growth of 728 million in 1750 (UN Estimate cited by Hertzler, 1956), 2.5 billion in 1950 (WRI, 1990) and 5.8 billion by the mid 1997 (Population Reference Bureau (PRB) Estimate, 1997) was observed eroding the carrying capacity of the planet's soils, forests, water bodies and altering its atmosphere. Men gradually began to notice the deterioration of the environment by observing the decline in the benefit they procure from natural resources.

The destruction of natural areas arose international concern about environmental problems. This concern led to the Stockholm Conference of 1972 held in Sweden on Human Environment and the Intergovernmental Conference on Environmental Education held at Tbilisi, Georgia, U.S.S.R in 1977 (UNEP, 1988). At the conferences, the need to give attention to environmental education as a means of raising people's awareness of

environmental problems was emphasized. Since 1972, subsequent conferences have been held on environmental issues.

Immediately, after the Stockholm Conference of 1972, Brown (1973) pointed out how the deterioration of natural resources in Ethiopia, particularly of vegetation, soil water and wildlife requires immediate conservation measures. He recommended the teaching of the general public about the depletion of the resources and its effects as a preliminary step toward the fulfilment of the intended conservation action.

A Pilot project in environmental education began in Ethiopia, in 1985, in response to the severe drought of the time in northern parts of the country (Beletu and Yosef, 1990). The pilot project included teacher training institutes, primary and secondary schools and the community skill training centers in North and South Wello, and North Shewa in which both theoretical and practical teaching was employed. The 1987 formative evaluation of the project showed the possibility of coordinating the efforts of the schools and the community for a common goal of conserving our environment. In an attempt to change the situation, land devoid of plants was recovered. This also increased people's awareness and concern for the environment (ibid.).

Opinion polls conducted in other parts of the world indicated the widely growing concern for environmental protection. The Harris Polling Organization, which surveyed public opinion and leadership attitudes around the globe in 1988 and 1989, found out how there was a wide spread concern about the quality of the environment (WRI, 1990). Similar results were obtained by the Gallup poll in Britain in 1988 (Owens and Owens, 1991). The opinion survey in some developing countries showed that the public would give priority to environmental protection if some immediate benefit was to be gained from it. For instance, people in Rwanda and Tanzania preferred the protection and the development of the national parks as long as they attract tourists (UNEP, 1988).

The economic view of natural resources could adversely affect the very existence of natural resources unless matching conservation measures are taken. It was from this point of view that the extraordinary United Nations Conference on Environment and Development (UNCED or the 'Earth Summit') was held in Rio de Janeiro in 1992. More than 110 heads of states and governments participated in the conference which gave emphasis to the need to integrate development activities with the conservation of the environment (Nazim and Polunin, 1993; Mintinger and Leonard, 1994).

In spite of the efforts made since the Stockholm Conference, environmental deterioration has been going on unabated (W.R.I,1990). Concerning the problem in Ethiopia as related to population pressure and its impact on the land, Time, the weekly news magazine (cited by Melaku, 1994), remarked in the year 1992 as follows:

Since 1990, Ethiopia's burgeoning population has stripped more than 90% of the country's forest for firewood and farmland, allowing a billion tons of top soil to be washed away every year. Some 8,000 acres (3200 hectares) of the once fertile highland can no longer bear crops and an area about the size of Swizerland may be bare rock by 2010.

Moreover, Leach and Mearns(1988), Harrison(1990), Asseged(1996) and Markos(1997) revealed that the deterioration of natural resources has been going on at an alarming rate (refer to the review part on pages(32-33))

Despite this problem the dissemination of environmental education does not seem to go on at a corresponding rate. The pilot project which was limited to North Wello, South Wello and North Shewa, and later included Harar and Awasa Teacher Training Institutes(Melaku, 1994), terminated in 1991 after recommending national environmental education program, the expansion of environmental education through out the schools in the country, the restructuring of the curriculum to encompass more elements of environmental education, the training of teachers and the co-operation among different

governmental and non-governmental organizations for the fruitfulness of environmental education (Zemedu and Beletu, 1994). At the summative evaluation of the project, it was found that students became aware of the issues and began to share their experience to their parents at home. The experience from North Shewa became evident in which students made their parents familiar with some vegetables by taking them home from the school. The establishment of environmental education clubs at non-project centers neighbouring schools also showed how much acceptance the project had in the community. As the attempt made to disseminate environmental education became effective, the surrounding community began practising terracing and planting trees (Beletu et al, 1992).

Yohannes (1992), in his study of the activities of the project centers in Wollo(North and South) and North Shewa, found that the integrated practical and theoretical method of teaching was effective. The community skill training centers helped a lot in the dissemination of environmental education to the surrounding community. According to Yohannes, local people have benefited from activities like afforestation, terracing, the introduction of irrigation system, gardening, environmental sanitation and family planning. But the lack of integrated curriculum and trained manpower were found to be the major constraints observed in the project. Moreover, the curriculum auditing committee for the inclusion of environmental education contents in the national curriculum found out that environmental education is neither a completely new nor different area. Contents of environmental education are incorporated in the curriculum with varying degrees from subject to subject with more elements in agriculture, home-economics, geography and biology. But they lack adequacy in addressing the issues of environment and development, the immediate environment of the learners and the problem solving approach. Hence, the restructuring of the curriculum to encompass elements focusing on learning about the environment from the environment was in order (Zemedu and Beletu, 1994). Opinion survey conducted on experts and professionals in different fields strengthened the urgent need for a nation wide environmental education program (Zemedu and Beletu, 1994).

In similar way to Ethiopian situation, viewing environmental education as a remedy to environmental problems, Huwang (1996:62) suggests:

The scale of environmental problems is so broad in nature that the damage cannot be reversed by fining or punishing few individuals or companies. An understanding of the scale of the problems and responsibilities for the solutions can be achieved only through education, that is, the most important function of environmental education.

Concerning the current status of environmental education in schools, Yosef (1995) and Sitotaw (1996) pointed out how the responsibilities of running environmental education lies on Regions' Education Bureaus following the decentralization of education system in the country. According to them, the responsibility of the federal government is giving some technical support such as training of teachers through workshops, seminars and the like. An interview made with Oromia Education Bureau Environmental Education Department Authority showed the presence of a problem of budget allocation to supervise the activities of environmental education in schools. Moreover, the direct contact between schools and the non-governmental organizations (Ethiopian Wildlife and Natural History Society (EWNHS) and 'Lem Ethiopia') has created unfair distribution of the support to the schools even though it has been gradually corrected with the co-operation of the organizations.

The school environmental project supported by EWNHS began in 1992 with its main focus on high school teachers and students who are interested in the environment (Workineh et al 1995). According to them, through students, environmental message can reach out to their families.

In general, the severity of environmental degradation in the country, which is now engulfing the whole country, including the wettest and fertile south western part, and the researcher's own experience of some school limited environmental education practices initiated him to work on ' The extent to which Senior Secondary School Students

disseminate Environmental Education to the Surrounding community' with particular reference to grade eleven students in East Wellega Zone. Grade 11 students were chosen to be the subjects of the study for the following reasons:

- I. They are mature enough to provide reliable information for their parents as well as for the research work.
- II. They have better experience of senior secondary education than students of the lower grades. Grade 12 students were excluded from the study for they do not have enough time to give the necessary information for the research work since they were on preparation for exam.

1.2 Statement of the Problem

It will be naive to think of an environmental education that does not involve the surrounding community. Environmental education can not be effective unless it follows the principle of, 'learning about the environment from the environment for the environment (UNESCO-UNEP E.E.S 17,1985; Yosef, 1995). Hence, it seems unavoidable to consider the environment and its elements including people in carrying out environmental education.

Allman et al (1982) recommend the establishment of an advisory council in schools consisting of the students, teachers and parents which could help to coordinate the school and the surrounding community for the common goal, the protection of our environment. Accordingly, parents or students who are members of the council act as liaisons between the school and the community. Moreover, teachers need to encourage the students to work on certain related tasks at home which allows the participation of both students and the parents.

Eventhough both the pilot project and the currently on going environmental education through clubs in the schools have recognized the role students are expected to play in disseminating environmental education, no attempt has, however, been made to

know the extent to which students have been participating in activities that could influence the surrounding community. This study will, therefore, attempt to answer the following questions:

- I. How is the awareness and the attitude of the students toward environmental issues?
- II. What does students practice in disseminating environmental education to the community look like as rated by their teachers and their parents?
- III. Is there interrelationship among students' awareness of environmental issues, attitude toward the conservation of resources and practices in the dissemination of environmental education?
- IV. Are there significant differences in the awareness, attitude and practices of environmental education between students who are environmental education club members and those who are not?
- V. Are there significant differences in the awareness, attitude and practices in the dissemination of environmental education between urban and rural students?
- VI. What means are used by the students to disseminate environmental education?
- VII. What new inputs are there in environmental education in schools since the introduction of the New Education and Training Policy of 1994 as perceived by teachers?
- VIII. What are the major problems that hinder the dissemination of environmental education as rated by teachers and the students?

1.3. Significance of the Study

The result of the study is hoped to contribute some useful data to environmental education planners, environmental protection project workers, teachers, students and the society at large. It will also give highlights for those who are interested to work on this intact area of research.

1.4. Delimitation of the Study

The study encompasses only some aspects of environmental education like the conservation of vegetation, soil, wildlife, water, environmental sanitation and population issues. The central theme of the study is examining the extent to which grade eleven students participate in the dissemination of environmental education to the surrounding community, not on the amount and the quality of what is disseminated. Moreover, the analysis of the high school curriculum made for the same purpose includes geography and biology for grade 9-12, agriculture and home-economics for grade 9-10.

1.5 Limitation of the Study

The major constraints encountered in conducting the study were:

- i. Lack of research on the area and shortage of reference materials.
- ii. Financial limitation to carryout prolonged field study so as to observe students activities at school and in the community.
- iii. Limited time to contact the parents of the students especially when they were not around the home.

Despite these constraints, every possible attempt has been made to bring the study to a fruitful end.

1.6. Operational Definition of Terms

Environmental Education- the awareness of environmental issues, feelings or concern for the environment and practices in dissemination of environmental information or involvement in practical conservation of resources.

Awareness- familiarity of the students with the major environmental problems and the measures to be taken to solve the problems as measured by the scores of students on the awareness test.

Attitude- favourable or unfavourable feelings or concern students express toward the conservation of resources as measured by the score of the students on attitude test.

Practice- students' participation through either oral transmission of information or practical activities that enhance the dissemination of environmental education both at home and in the school, as rated by their teachers and their parents.

Dissemination-the sharing of ideas, information and experiences in environmental education with the others.

The Surrounding community- people who are members of the community, having sons/daughters from senior secondary schools, and inhabiting the vicinities of the schools with in a distance of about a daily travel on feet by the students to attend their schooling. It covers an area of about 15 kms radius surrounding the schools.

Environment- the places or situation inwhich plants, animals and people live.

Conservation- the protection and wise use of resources

Resources- elements or combinations of elements of nature that have functional value to man, either found naturally or as modified by man. For example, vegetation, animals, soil, water, etc.

Environmental Education Club- a voluntarily organized group of students and teachers who have joined together to share their experiences and interests with conservation of the environment among themselves and to the community.

Outdoor Education- an experiential process of learning by doing which takes place primarily through exposure to out-doors.

Informal interview- is a method of data collection through conversation with concerned individuals without making them aware of the purposes of the interview and without writing the responses of the respondents at the time so that the respondent may freely discuss on the issue and give unbiased information.

* For some technical terms used in the study refer to appendix L

CHAPTER TWO

2. REVIEW OF RELATED LITERATURE

In this part, different theoretical issues related to the problem are reviewed to give a background information about the study.

2.1. Historical Background of Environmental Education

Environmental education is as old as mankind. Man, in his daily practice, used to teach his children how to cultivate a garden, how to grow trees, how to plough and how to interact with nature in general. But, because of his short-sighted world view, he used to think of the earth as having unlimited resources. This brought about the improper utilization of natural resources.

As a result, the world has been facing a number of environmental crises like loss of biological diversity, desertification and drought, water pollution, soil erosion, depletion of ozone layer and global warming. These problems initiated ecologists, individuals, organizations and countries to call up on international communities to give attention to environmental problems (Porter and Brown, 1991 NEPA, 1994). Accordingly, in 1968, a Swedish delegation to the United Nations called the attention of the international community to the growing crisis in the environment. This marked the first formal call for a global approach to the worsening environmental conditions which resulted in the Stockholm Conference of 1972, the first international conference on Human Environment (UNESCO-UNEP Environmental Education Series (E.E.S) 1983).

The Stockholm Conference declaration stated that "man, as both dependent and moulder of his environment, is responsible for its wise use," (ibid.). At the end of the conference, it was recommended that attention be given to environmental protection with particular emphasis on settlement, health, conservation, natural disaster prevention and

land ecosystem (NEPA, 1994). The conference also recognized the role of formal education in bringing environmental matters to the awareness and understanding of the general public. Hence, the restructuring of the curriculum to encompass environmental issues was recommended (UNESCO-UNEP E.E.S 8,1983).

Consequently, in 1975, international workshop was held at Belgrade in Yugoslavia and laid down frame works and guiding principles of environmental education which was then revised, evaluated and amended at the Tbilisi conference of 1977 (UNESCO-UNEP E.E.S 17, 1985).

Thus, it appears that the concern for environmental education as a distinct entity became evident in the early 1970s; and therefore, the 1970s became to be referred as the decade of environmental education (Meadows, 1989; UNESCO-UNEP E.E.S 17, 1985).

The need to give priority to environmental education so as to reap its ultimate benefit, that is, responsible action in protecting our environment was echoed by Environmental Success Index (1992); Orr (1993).

In 1990s, the issue of integrating environmental issues and development has become the main theme of environmental education. Thus, 'education for sustainable development' became the current issue of the day (Hopkins et al, 1996: 2-5). Adams (1990:3) defines 'sustainable development' as "development which meets the needs of the present without comprising the ability of future generations to meet their own needs." This is to mean, education should help people to know that environment and development are inseparable and that every development activity should take the conservation of natural resources into consideration so as to make them long lasting.

As narrated by Hopkins et al (1996), a new international consensus on the critical importance of education for 'sustainable development' has emerged from a series of recent United Nations (UN) conferences: the UN conference on Environment and Development

held at Rio de Janeiro, Brazil (1992); conferences on population in Cairo, Egypt (1994); World Summit for Social Development, Copenhagen, Denmark (1995); the Fourth World Conference on Women, Beijing, China (1995); and the Second United Nations conference on Human Settlement, Habitat II, Istanbul, Turkey (1996). The general theme of these subsequent conferences reveal that environment, population and development are interrelated and inseparable.

Thus, the growing international concern about the global environment is not an historic incident. It is a belated response to the fact that the major components of the biosphere including the atmosphere, the oceans, soil cover, the climate system and the range of animal and plant species have been altered by the intensity of human exploitation of the earth's resources in the twentieth century.

2.2. The Concept of Environmental Education

Environmental education has been defined in a number of ways. The International Union for Conservation of Nature and Natural resources (IUCN) Commission on Education (1970:40) recommended the following definition for wide use at the International Workers Meeting on Environmental Education in School Curriculum:

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. Environmental education also entails practice in decision making and self formulation of a code of behaviour about issues concerning environmental quality.

More specifically, the Finnish National Commission for UNESCO at Jammi (1974) as quoted in Sytnik et al (1985), defined environmental education as a way of reaching environmental protection targets and is not a separate branch of science or a

special subject of study. It should be included in the entire life-long educational process. Emphasizing an interdisciplinary approach to environmental education, the National Association for environmental education (1990) declared that environmental education runs through the whole curriculum. In this view, good environmental education knows no subject boundaries nor should it be confined to particular lessons or occasions.

Thus, environmental education is the process by which the learners gain knowledge, attitude and skills about their environment in an interdisciplinary approach that enables them to conserve their environment and live in harmony with it.

2.3. Goals, Objectives and Philosophical Premises of Environmental Education

It was at the Intergovernmental Conference on environmental education held at Tbilisi (1977) that the substantive goals, objectives, philosophical premises and guiding principles on which to base environmental education were formulated (UNESCO UNEP E.E.S 8, 1983; E.E.S 17, 1985; E.E.S 3, 1986)

Accordingly, the general goal of environmental education is to develop active and well-informed individuals who are aware of their environment and their responsibilities in protecting and conserving their environment. To this end, education must develop in all individuals an understanding of the interactions and interdependence of the physical, biological, social, economic and cultural aspects of the environment and the improvement of the environment (ibid.).

The objectives of environmental education as recommended by the Tbilisi Conference to serve as foundations for educational activities are:

- A) Awareness- to help individuals and social groups acquire awareness and sensitivity to the total environment and its allied problems.

- B) Knowledge-to help individuals and social groups acquire basic understanding of the total environment, its associated problems and humanity's critically responsible presence and role in it.
- C) Attitude- to help individuals and social groups develop strong feelings of concern for the environment and the motivation for actively participating in its protection and improvement.
- D) Skills- to help individuals and social groups acquire the skills for identifying and solving environmental problems.
- E) Participation- to help individuals or social groups develop sense of responsibility and urgency regarding environmental problems to take appropriate action to solve those problems (UNESCO-UNEP E.E.S 17, 1985: 3-4; E.E.S. 15,1990:13).

The premises of the philosophy of environmental education are:

- A) The rate of social and cultural evolution is faster than the rate of biological evolution.
- B) Environmental problems are often complex and require the expertise of various disciplines for their solution.
- C) Environmental problems should be seen, first, in their local context for the individual to see their relevance to him, and second, in their global context to impress on the individual their magnitude and persuasiveness.
- D) The human population, more than any other living species, has wrought damage to the environment and, therefore, it should be held responsible for corrective actions that will hasten the recovery of the damaged environments and prevent the destruction of others.
- E) The welfare and continuing existence of human kind on the earth depends on the values people have concerning:
 - regard and consideration for others, particularly, the less fortunate
 - care and protection of humanity's resources, and
 - strong drive to actions that serve humanity as a whole and improve the environment.

- F) The behaviour of the people to the natural and man made environments is the overt expression of their understanding and skills, and
- G) Harmonious ethical relationship of man to his environment, having environmental conservation and enhancement as its theme, can be developed from early childhood onwards through formal and non-formal education (UNESCO-UNEP E.E.S 8, 1983:17-18). For guiding principles of environmental education (see appendix A).

2.4. Awareness Attitude and Practices in Environmental Education

The goal of environmental education is to develop a world population that is aware of, and concerned about the environment and its associated problems, and which has the knowledge, skills and attitudes, motivation and commitment to work individually and collectively toward solutions for current problems and the prevention of the new ones (UNESCO-UNEP, E.E.S 18, 1985).

This being the case, people's awareness of environmental problems varies from country to country, from region to region within a country, and even from individual to individual. In 1986, a survey conducted in member states of European Community showed that, community citizens on the whole are not particularly conscious of pollution in their own local area (UNEP,1988). But, Owens and Owens (1991), referring to the 1988 Gallup opinion polls, indicated that the awareness of environmental problems which was formerly restricted to small section of the population in Britain, has been diffused among the public to the extent of perceiving environmental problems second only to a super-powers' conflict as the greatest threat to human race.

Although similar opinion polls are not available from developing countries, it seems that most of them, with their increasing debt burdens and economic problems, give priority to economic growth, sometimes at the expense of environmental conservation. There are a number of factors that influence one's awareness of environmental issues. In

their study, Rasmev and Rickson (1976) found that grades in schools are associated with moderate knowledge. Moreover, they indicated that exposition to educational materials in school, from mass media, from family and friends has relation with environmental knowledge. Similarly, Alaimo and Doran (1980) reported that science classes seemed to have a positive effect on students knowledge about the environment. According to UNESCO-UNEP E.E.S 8 (1983), the awareness of environmental problems, in Africa, is by far more felt amongst intellectuals, particularly scientists, professors and to a lesser extent, university students than sectors engaged in agricultural and industrial production. Hence, accessibility to educational opportunities seems to strengthen one's awareness of environmental issues.

On the other hand, there is a widely held position that environmental knowledge leads to favourable attitude toward the environment (Fortner, 1978; Fortner and Teates, 1980; Moore, 1981). According to Geogre's research cited in Knapp (1972), participation in nature clubs, nature camps and other outdoor activities have a significant positive effect upon conservation attitudes. Moreover, the research work of Gross and Pizzini (1979), in which 5th and 6th graders were involved in exploration of wilderness community of the woodland of Iowa, produced a positive attitudinal change in the students. Jernigan and Wiersch (1978) carried out a study on children who resided in sub-urb of a large city. The children were exposed to cognitive awareness and affective units outdoors as well as in the classroom. The result was that the affective unit outdoors produced a significant change in students' attitude toward the environment.

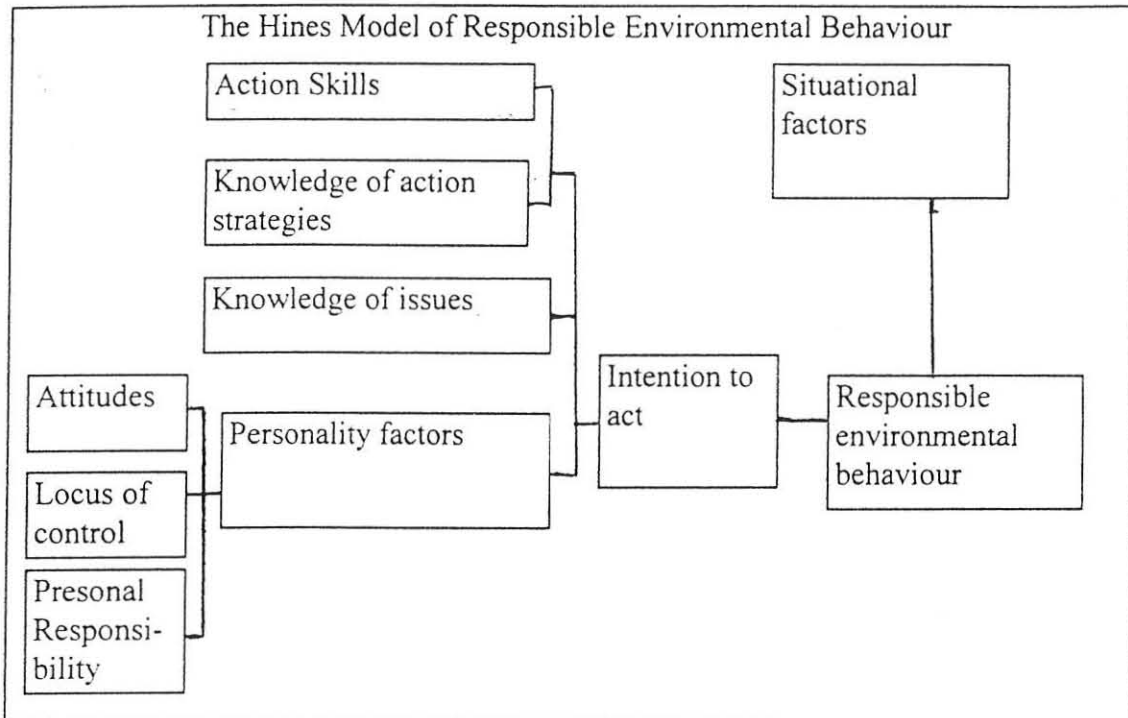
On the other hand, some research findings in environmental behaviour do not bear out the position that awareness of environmental issues leads to favourable attitude toward the environment. As shown by Pettus (1976) and Kinsey (1976), research related to conservation and other broad areas of environmental concerns indicates that being better informed about environmental conditons does not necessarily mean people will be more favourable toward enforcement of environmental controls.

Hines et al (1986/87), after analyzing the research literature of 128 studies in environmental education, prepared a model from which they made the following inferences:

- i. an individual who expresses an intention to take action will be more likely to engage in action than will an individual who expresses no such intention. Before an individual can intentionally act on a particular environmental problem, that individual must be aware of the existence of the issue. Thus, knowledge of the issue appears to be a prerequisite to action.
- ii. Before an individual can intentionally act on a particular environmental problem that individual must be aware of the existence of the issue. Thus, knowledge of the issue appears to be a prerequisite to action.
- iii. He has to have skills for appropriate application of his knowledge.
- iv. The individual must possess the desire to act which is affected by a host of personality factors- locus of control, that is , individual's belief in being reinforced for a certain behaviour, attitude toward environment and toward taking action and personal responsibility toward the environment.
- v. Situational factors such as economic constraints, social pressures and opportunities to choose different actions may serve to counteract or strengthen the variables in the model.

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Source: Hines et al (1986/87)

Hines et al (1986/87) research revealed that:

- i. Environmental sensitivity has a dramatic relationship with behaviour
- ii. Knowledge of ecology does not, in itself, produce environmental behaviour.
- iii. Attitude toward pollution, technology, economics found to be significantly related with behaviour in some researches
- iv. Perceived skills is one of the best predictors of environmental behaviour.

Hence, environmental behaviour or practice is influenced by a number of variables. However the variables may be, the ultimate goal of environmental education is solving environmental problems. In view of this, it was stated in Environmental Success Index of America (1992:129) that "a responsible action is the ultimate benefit of sound education." A number of actions can be taken to solve environmental problems. Baines(1991:92) recommends the taking of actions starting from a simpler and smaller

steps like turning off the tap while brushing our teeth, reducing the level of water in our bath and turning off lights when they are not needed to the more complex ones.

2.5. Some of the Factors Influencing the Dissemination of Environmental Education

2.5.1. Curriculum- curriculum is the core of education, no less so of environmental education. It is not enough to tell pupils or students about ecology or make them aware of environmental concerns. An effective curriculum takes them beyond these levels to that of interacting with the environment themselves and assessing its impact (Neal and Palmer, 1990:40; Connect, UNESCO-UNEP news letter, (1989). Underlying the initiation of environmental education curriculum must be the interest of both teachers and students supported by administrative bodies and the community (Allman et al, 1982).

Though environmental education as a distinct entity is of a recent origin, its elements have been included in different subjects like nature studies, fields studies, biology and geography. But, the contents were concerned only with two dimensions related to the environment, namely, learning from the environment and learning about the environment. A vital third dimension, learning for the environment, was missing (UNESCO-UNEP E.E.S 18, 1985). Moreover, the methodology of teaching these subjects was limited to the impartation of factual knowledge about the environment; the content was not based on the real life problems and an interdisciplinary problem solving approach to environmental problems was not evident.

Allman et al (1982) states that environmental education curriculum should focus up on environmental problems and solutions initiated by teachers, students and the community. This means that environmental education is not limited to classroom activity and must as well look outward to the community. In doing so, field activities play a significant role (Leal Filho, 1993, Hungeford, 1989).

As recommended in UNESCO- UNEP E.E.S 17 (1985:28), environmental education curriculum has to encompass the following:

In all environmental education activities, observation of the real environment, inquiry of knowledge related to the topic and the real needs and problems of the community, search for solutions, decisions making and commitment on the part of the students, the teachers and the community would guarantee more effectiveness of the curriculum of environmental education.

It is a well recognized pedagogical principle that participation in concrete action directed at a given goal greatly increases learning. That is why Allman et al (1982), Leal Filho (1993), Meadows (1989), UNEP (1988) recommended the active participation of students in learning by doing or problem solving approach.

As Leal Filho (1993) points out eventhough there is a lack of research as to how field studies can be used to engender environmental awareness among pupils, some examples detailing the environmental education potential of field studies are evident from literature. Clarke quoted by Leal Filho (ibid.), for example, investigated the value of field studies for 11-15 year-old-pupils: tests given to the students showed, in terms of effectiveness, that field studies were superior to the corresponding indoor classroom work. Field studies enhanced the ability of the students to write and express their own ideas logically and to work together. They were also found to enhance students appreciation of nature and natural resources.

According to Leal Filho (1993:93), the underdevelopment of field studies in developing countries results primarily from the lack of the appropriate educational elements in the curriculum both in terms of content and in context of teaching program and learning styles. Thus, such countries need to develop new initiatives to integrate field studies in their curriculum.

The way different countries approach environmental problems may vary owing to the specificity of the problems they face. This does not mean that there is no similarity between countries in their curricular approach to environmental problems. A comparative survey of the incorporation of environmental education in to the curriculum of 13 countries (see appendix B for the list of the countries) around the world has revealed that some non-controversial set of acceptable values have been evolved (UNESCO-UNEP E.E.S 17, 1985:127). These include:

- adaption of life styles more conducive to the conservation of natural resources,
- need for pollution control,
- value of clean and healthy environment,
- need to strike a balance between development and environmental exploitation, and
- individual's responsibility for environmental welfare.

As seen in the survey, the introduction of environmental dimension to secondary school curriculum was carried out through a variety of procedures-interdisciplinary and multidisciplinary approaches. The procedures range from super-imposition of environmental education as a separate subject on those already found in the curriculum, to the total integration of environmental concepts into contents of the existing subjects (UNESCO - UNEP E.E.S 17, 1985; Galishin and Doraiswami, 1972; United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP, 1990). The approaches can be grouped in to three:

- i. An integrated course can be introduced as a separate discipline equal with other school subjects. This is an interdisciplinary approach which requires a holistic view based on understanding of relevant subject matters such as biological, geographical and cultural elements. The understanding of relevant subject matter fields is important. Therefore, the environmental studies need a process of integration. Outdoor education can be effectively applied for such purpose. A short coming in the interdisciplinary approach is the difficulty of getting teachers

with ability to teach such an integrated subject (UNESCO - UNEP E.E.S 17, 1985; Huwang, 1996). As stated in E.E.S (17,1985), few countries like U.S.S.R and Colombia attempted this approach on a limited scale. On the other hand, as reported by UNESCAP (1990), the interdisciplinary separate discipline approach is, now, gradually gaining ground in many countries.

- ii. The second approach is infusing contents relevant to various environmental problems and issues in to the existing subjects of the curriculum.

This approach has been adopted by almost all countries surveyed, and the infusion has been mainly into science and social studies. For example- the concept of photosynthesis, cycles of nature, food chains and food webs, ecology, etc, were treated in a wider context in science, making them more meaningful to real environmental problems.

- iii. The third approach is adding special units on environmental studies in the existing curriculum. In this case, the environmental content is not fully integrated in to various units of the subject but is added as a separate, independent unit. For instance, adding the unit on ' The utilization of Natural Resources' in social studies.

Therefore, environmental education has not had an established position in school curricula in spite of its importance in nature.

Eventhough conservation is the ultimate goal of environmental education, it is not found to be an easy task to implement in the process of development planning and implementation. This is due to the difficulty of matching human ambitions and desires for development and the need for conserving resources (World Commission on Environment and Development, 1990; O'Riordan, 1995) . For instance, the conference at Rio de Janeiro, Brazil, 1992, on Environment and Development could be seen as the struggle between developed and developing countries to define ' sustainable development'

in the way that fits their own agenda (Hyder, 1994). Accordingly, developed countries put environment, first. By contrast, developing countries, most of which are poor and still struggling to meet basic needs, put development, first. Concerning the problem, Gupta (1988:73) states:

The conflict between development and environmental protection or between the interests of the developed and developing countries, is due to over looking the fact that there is only one earth. If rainforests are to be preserved for the sake of the world, it is necessary to provide technical and financial help to the countries that still have rainforests so that development is possible without uncountolled deforeation.

Poverty and environment are linked in a close and complex way. People who live in poverty often create environmental degradation because their poverty forces them to do so (Blaikie in Adams, 1990; Gandhi in Gupta, 1988, Nazim and Polunin, 1992). In recommending the solution for the problem, Nazim and Polunin (1993:5) states:

Bringing these people out of poverty cycle has now become an environmental necessity. To continue to ignore their needs would force them in to actions not only harmful for their survival but ultimately dangerous for the security of our planet earth. No amount of environmental logic or reasoning can prevent a poor and needy man from cutting a tree for feul, or cultivating unsuitable slopes for food to succour his otherwise starving family.

In 1980, IUCN together with United Nations Environment Program (UNEP) and World Wildlife Fund (WWF) produced world conservation strategy which clearly demonstrates that conservation and development must be inseparable parts of single effort to build a sustainable future (Thibodeau and Field, 1984; Adams, 1990).

Concerning the need for conservation, IUCN(1991:4) warns, under the title 'Gambling with Survival', that our civilizations are at risk because we are misusing and

disturbing natural resources. We are pressing the earth to the limits of its capacity. According to IUCN, since the industrial revolution, human numbers have grown eight-fold. Industrial production has risen by more than 100 times in the past 100 years. This unprecedented increase in human numbers and activities has been significantly diminishing the capacity of the earth to support human and other life. In less than 200 years, the planet has lost 6 million km² of forest; the sediment load from soil erosion has risen three-fold in major river basins, and 8 times in smaller more intensively used ones; water withdrawals have grown from 100 to 3600 km³ a year. According to new estimates by the world's leading soil scientists, more than 1.2 billion hectares of vegetated land- an area as large as India and China put together-has been significantly degraded since the Second World War. Atmospheric systems have been disturbed, threatening the climate regime to which we and other forms of life have long been adapted. Since the mid 18thc, human activities have more than doubled the methane in the atmosphere; increased the concentration of CO₂ (Carbondioxide) by 27% and significantly damaged the stratospheric ozone layer.

Thus, pollution of air, water and soil become a serious and continuing threat to the health of humans and other species. Most astonishing of all, the 5.3 billion people now on earth are already using 40% of over most elemental resource- the energy from the sun available by green plants on land (IUCN, 1991). Yet, despite this take over of nature, well over 1 billion people in the world are malnourished (WRI, 1992). This could be attributed to increase in the number of population, and uneven and disproportionate consumption of natural resources particularly between developed and developing countries.

This being the case, there are many problems that impede conservation. Among them are:

- A) relative weakness of conservation in national policy,
- B) Inadequate legislation and weakness in implementation,
- C) Shortcomings in training and education,

- D) lack of support for conservation policies, and
- E) Lack of conservation-based rural development. (Thibodeau and Fields, 1984; Adams, 1990).

In general, leading a sustainable life must be a guiding principle for all world's people. To make this possible, Dooge et al cited by O'Riordan (1995:17) and IUCN (1991:5) recommend:

We need a new kind of development that rapidly improves the quality of life for the disadvantaged. The earth has limits and to live with in those limits and see that those who now have least can soon get more, two things need to be done: One, population growth should stop everywhere; second, the rich must stabilize and in some cases, reduce their consumption of resources.

To adopt this new pattern of life, a significant change in the awareness, attitude and practices of people is in order. Thus, the role of education in bringing change is undebatable.

2.5.2. Participation in Environmental Education Club

As stated by Gruber and Beatty (1954), the rapid changes in modern life caused the addition of new issues in school program which could be realized through co-curricular activities. Accordingly, as Hopkins et al (1996) suggest, organizing conservation clubs which could serve as a model for the school and surrounding community is essential in teaching environmental education. The organization of environmental education clubs is not a today's phenomenon in Africa. For instance, at the workshop held at Lusaka, Zambia, in 1979 on the 'School curriculum' by African countries, the representative of Upper Volta, Zongo, reported that in some schools of his country, there were clubs for protection of nature which were promoted by natural science teachers (Schofathler, 1984). A well-planned, well-organized and well-

administered club program in secondary school will serve to enrich the classroom activities (Gruber and Beatty, 1954). As identified by Gruber and Beatty (1954) and Kown (1956), the characteristics of good club activities are:

- . **Flexibility-** the club should be sensitive to changing community conditions.
- . **Immediacy-** the club should seize upon contemporary problems and activities and assist students to participate in them effectively.
- . **Interest-** the club should appeal to the interest of its members.

Concerning the relationship between participation in club activities and classroom achievement, Muller, Swanson, Prunty, Hill, and Monroe all cited in Kown (1956:600-601) show that there is no evidence that reveals participation in extra-curricular activities will lower student's marks. On the other hand, Worcester, King, Yeull, Hall, Cooper, Baird, Griffith, and Morley et al cited in Kown (ibid.), found that participation in extra-curricular activities have a positive effect on classroom achievement. From these, it seems that participation in co-curricular activities does not affect student's achievement negatively.

As many surveys indicate, young people are concerned about the environment and also want to do something to protect it. Some young people have shown their concern by supporting one of the campaigning groups like Friends of the Earth or Green Peace while some have shown more interest in doing practical work as volunteers with conservation organizations (Scoffahm, 1991). Moreover, the call on the countries of the world by the International Youth Forum, held at Lunenburg Heath in 1970, to conserve resources can be an indication of the attention youth give to their environment (Allaby, 1971).

Regarding the influence of environmental groups, UNEP (1988) reveals that several environmental groups have succeeded in mobilizing support for particular environmental issues, and thereby, affected the decision making process in some

countries. For example, anti-nuclear groups succeeded in halting the construction of new nuclear power plants in U.S.A, Austria, Sweden, the Philippines and other countries.

Some research findings have indicated that an awareness and favourable attitude about the environment is associated with participation in co-curricular activities (Holland and Ander, 1987; Knapp, 1972). On the other hand, Ramesy and Rickson (1976) showed that participation in co-curricular activities was not related to the Knowledge of ecological concepts or attitude toward pollution abatement. Thus, researches on the relationship between one's participation in co-curricular activities and the knowledge and attitude toward the environment seem to be inconclusive.

2.5.3. The Role of Mass media

Information transmission plays a vital role in environmental education. Hence, an effective means of communication is indispensable for increasing people's awareness of environmental issues (UNEP, 1988; Karembu, 1996; Patel, 1980).

The media most frequently used to obtain environmental information depends on one's educational and socio-economic levels. A study carried out in U.S.A in 1986/87 showed that newspaper and television were the major sources of environmental information. Yet, there is good evidence that the power of mass media to influence attitudes in rural areas of developing countries is very limited. In such areas, traditional interpersonal forms of communication appear to be by far more effective (UNEP, 1988:31). Because of their relevance to the cultural, social and physical set-ups, traditional media systems such as popular theatres, folklore and dramas contribute a lot to the dissemination of environmental information (IUCN, 1991). In this case, there need be a two-way flow of information: enabling people to contribute as well as receive ideas and information. The International Conference of Thessaloniki, Greek (1997), recommended the need to establish effective communication strategies as an integral part of any major

scientific inquiry or program so as to disseminate their findings to the public (UNESCAP, 1997).

2.5.4. School-Community Relationship

If a school is to play a societal role, there need be a close relationship between the school and the community. Many public agencies have recognized the importance of coordinating the delivery of social services to the needy groups and are beginning to use schools as a 'hub' and 'broker' for this integrated approach (Papagiannis, 1992).

Stressing the need for strengthening the relationship between schools and community, Olsen(1963) recommended that many systems must be designed between schools and the community in which children and adults alike may study and serve the community. In order to exchange environmental information between the school and the community, Allman et al (1982) suggest that a school has to organize an advisory council consisting of teachers, students and parents which organizes and facilitates environmental education activities both at the school and in the community.

Cole, as cited by Schofathler (1984), pointed out that relating education to real life situations and involving students in problem solving activities initiate the learners to pass on their knowledge to their parents in the village. To facilitate this, students have to be encouraged and given responsibility to solve some environmental problems at home (Allman et al, 1982:29; Batten, 1959:74). As both children and parents wrestle with environmental problems, a greater awareness could be developed for preserving and conserving our natural and human resources.

As stated by Douglass(1963:563), the influence of high school students in changing the view of their parents is not simple mainly for two main reasons. Firstly, a high school student is old enough to rely on as a source of information; and secondly parental relation forms an emotional link that ensures the students sympathetic audience

at home. However, it is uncommon in Africa for children, through their schools to directly and actively participate in decision making process and development schemes of local communities(Sikula, 1981:58-61). Nevertheless, any consideration of environmental education program in schools forces the community participation issue.

According to Sikula, a systematic implementation procedure for school, community relationship programs can be carried out through cooperative work of central administration, local administration, classroom teachers, students and parents. Students have the responsibility of disseminating to parents accurate and appropriate information regarding the school, involvement in school sponsored activities and related community events, and assisting the establishment of good community relations at local level. On the other hand, parents also have to cooperate with school activities.

2.6. Environmental Education in Ethiopia

Ethiopia is among the countries which have been facing serious environmental crises notably from land degradation, overgrazing, deforestation, loss of biological diversity, population growth, health and sanitation problems. Above all, general poverty has been identified to be the highest threat to the environment (NEPA, 1994:1). These problems are attributable to man's improper utilization of his environment. In response to these problems, particularly in northern parts of the country, a pilot project in environmental education began by the Ministry of Education (MOE) in collaboration with the Ministry of Agriculture (MOA) in 1985 (Beletu and Yosef, 1990:6). The Project was expanded to teacher training institutes and secondary schools. The main purpose of involving schools in the project was to make students and teachers develop a clear concept of environmental education and disseminate it to the general public. The objectives of the project were:

- A) To assist the on-going natural resource conservation and development projects by MOA.
- B) To make individuals understand the need and importance of personal and environmental hygiene, and safe drinking water and balanced diet.
- C) To help individuals and social groups realize the importance of family planning.
- D) To support extra-curricular activities and labour education in schools.
- E) To help pupils, adults, older men and social groups in general better comprehend the interrelationship and interdependence of natural phenomena.
- F) To make individuals and social groups develop a responsible behaviour towards the environment.
- G) To help students to develop a love for nature and to acquire skills and knowledge on how to conserve, protect and develop natural resources.
- H) To encourage students and teachers to combine theoretical knowledge with practical activities.

As indicated by Beletu and Yosef (1990), environmental education was conducted both in theory and practice to enable the learners to apply their knowledge in solving environmental problems. In doing so, the traditional subjects such as biology, agriculture, geography and home-economics were used for deliberation of environmental issues followed by practical activities such as tree planting, terracing and vegetable gardening. Conducting seminars and orientation programs, and preparation and distribution of reading materials were other means used in disseminating environmental education.

NEPA(1994), stating on the achievements of environmental education, indicated that even though environmental problems lacked due attention, the soil conservation program of MOA was appreciable. The Environmental education project of MOE, in its life span of six years (1985-1991), has developed experiences in gathering, organizing and disseminating environmental information.

Nowdays, environmental education has become one of the burning issues of the time. The recurrent drought (refer MOE's report on Environmental Education in 1988 for details), the variability and undependability of rainfall and the destructive floods are causing damage to human life and property. As a result, environmental issues have begun to appear on the agenda of the conferences and the media.

As to the concern given to environmental education by the 'New Education and Training Policy of Ethiopia,' Tekste Negash (1996) notes that one of the new inputs and strengths of the policy would be inspired by the need for environmental protection.

As mentioned earlier, there is a rapid degradation of natural resources in Ethiopia. Harrison (1990) and Asseged (1996) indicate that seven out of ten Ethiopians live on the mountaineous highlands from which an estimated 3.5 billion tons of soil are washed away each year. In more details, estimates made by the National Conservation Strategy Sectariat (1994) shows that out of 54 million hectares of land constituting the highlands: 26% is seriously degraded, 24% is moderately degraded, while on over 4% of the land, soil depth is so reduced that the land is no more able to support cultivation.

Various sources like FAO (1984); Cesen (1986); UNDP/FAO/ MOA (1984; De Vleter (1989); IUCN (1990) in Markos (1997:75-76) estimate that 35.4% of the total area of the country was a forestland at the beginning of the century. A subsequent review based on field inspections and a critical analysis of the available information concluded that the remaining area of natural highland forest was only between 2.5 and 3 million hectar (De Vletter, 1989 cited in Markos (ibid.).

Deforestation is estimated to take place at the rate of 150,000-200,000 hectar per year, equivalent to 6% of the remaning high forest (National Conservation Strategy, 1994; Asseged 1996). At this rate of deforestation, mainly due to rainfed agriculture, the natural forest will be gone in 15-20 years (ibid.). Feulwood consumption is also one of the major contributors to deforestation. Feulwood accounts for about 77% of the total

and 81.5% of the traditional fuel sources (Abebe cited in Markos, 1997); and 84% of the total energy consumption in rural areas (Asseged, 1996:10).

Leach and Mearns (1988) indicated that fuelwood consumption greatly exceeds the annual growth rate of trees stocks in some sub-saharan African countries. Studies show that fuelwood use exceeds the growth rate of tree stocks by 70% in Sudan, 75% in Northern Nigeria, 150% in Ethiopia and 200% in Niger. Between 1970 and 1983, the price of firewood rose by 278% in Addis Ababa, becoming the highest in Africa (Markos, 1997).

In general, the unwise use of vegetation in Africa, Ethiopia included, occurs in 4 main ways. These are forest fire, overgrazing by domestic stock, timber cutting for construction and fuel and cultivation by man. Cultivation is the most unwise use of all forms (Brown, 1973:30; Markos, 1997:125). Thus, the extent at which the forest is being destroyed appears threatening to its future existence unless urgent conservation measures are taken.

In water resources, Ethiopia is endowed with a number of lakes, reservoirs and rivers. Despite these abundant sources, presently only about 27% of the total population have access to safe drinking water while the remaining gets its water from polluted streams and wells (Asseged, 1996). The water resources are seriously affected by sedimentation and siltation due to high rate of soil erosion (ibid). The other major cause of water pollution is waste disposal in to water bodies (Muzeid, 1996).

The country's wildlife, which is said to be rich and diverse, has also been threatened by the destruction of forest and uncontrolled hunting. Concerning, this situation, Brown (1973:43) commented that, " Ethiopia has a very fine but sadly negelected and depleted wildlife resource".

With an estimated population of 58 million and a rapid annual growth rate of 3%(Nigussie, 1997) which put great pressure on natural resources, the need for conservation is a crucial issue in Ethiopia. According to Brown (1973:2-8), the primary justification for conservation in Ethiopia is the deprivation from misuse, over many centuries, of the rural environment. Hence, the conservation of vegetation, soil, water and wildlife is one of the burning issues requiring an urgent response from all of us.

In view of this, environmental protection Authority in collaboration with the Ministry of Economic Development and Cooperation (March 1996) formulated the following environmental education and awareness policy:

- A) To promote teaching of environmental education on multidisciplinary basis through integrating it into school curricula.
- B) To target the public, particularly those involved in public and private sector activities that have significant environmental impacts for environmental education and awareness programs.
- C) To recognize the role mass media play and to effectively use them in creating and promoting environmental awareness in view of physical problems of access and communication in Ethiopia.
- D) To provide inservice training in such specialized subjects as environmental economics, environmental law, environmental monitoring, geographical information system, pollution monitoring and control, and hazardous waste management.
- E) To initiate, encourage and support the involvement of local community and religious leaders in programs to promote environmental awareness.

Concerning the present state of environmental education in schools, Sitotaw (1966) states that responsible bodies have been represented at regions' education bureaus since 1992. In order to strengthen the theoretical knowledge offered in the classroom,

environmental education clubs have been organized in senior secondary schools, teacher training institutes, and in some junior secondary schools.

According to Sitotaw, there has been a growing participation of students and teachers in environmental education club. The activities of some of the schools are found to be encouraging in such as preparing nursery beds and distributing seedlings to the community, planting trees, cleaning and beautifying school compound, collecting and preserving different species of plants and animals, digging and opening sewage and the like. The Planet Earth, an Environmental and Developmental newsletter, produced by Lem Ethiopia(1996), strengthens the idea of Ato Sitotaw. Ato Sitotaw also appreciated the support given to the clubs by Lem Ethiopia and EWNHS. The school project in environmental education by EWNHS was started in 1992 with its focus on high school students and teachers in grades 9-12 (Workineh et al, 1995). Among the governmental organizations which have affiliation with environmental education Ministry of Education and Ministry of Agriculture have played a significant role in environmental awareness building (NEPA, 1994).

In countries like Ethiopia where the largest proportion of the population is in the countryside and inaccessible to current information, schools are expected to contribute a lot in delivering environmental information through oral communication, dramas, theatres and practical demonstrations.

In Ethiopia, few research is done on environmental education in schools. As a study by Melaku (1994) shows, eventhough some elements of environmental education objectives and contents are included in social study courses of some teachers training institutes, they are not to the standard of the present day environmental education teaching.

As far as the relationship between the school and the community is concerned, Tadele (1995) found that the school community relationship is at low level, and is one way, where there is a limited flow of information from the school to the community. Celebrating school days and involving parents to correct the misbehaving students are the typical affairs in which parents are involved. As indicated by Tadele, some of the major factors contributing to the low level of school-community relationship were the public feeling that "the education of children is the sole responsibility of schools", lack of interest on the part of the parents to participate in school affairs, lack of know-how by the school personnel and public relation workers; absence of system wide activities to backup efforts of individual schools, and high formalization in educational hierarchy to consider desires and suggestion of the public.

In general, despite the lack of research on the awareness and attitude of the students toward environmental issues and their participation in disseminating environmental education, there are indications of students' participation in preparing nursery beds and planting trees, dramas and theatres related to environmental education, sanitation of the surrounding, conducting meetings, preparation of environmental bulletins and the like in some schools.

CHAPTER THREE

3. METHODOLOGY

In this study a descriptive survey method of research was followed since it is found to be appropriate to collect large quantity of data pertaining to the problems in question.

3.1. Subjects

The target population of the study were grade eleven students of 1997/98 academic year and their parents or relatives in East Wellega zone. Deputy-directors, home-room teachers, unit-leaders and environmental education club leaders of the schools were also included in the subjects of the study to get information on the activities of the students in and around the school.

3.2. Sampling

According to information obtained from Environmental Education Department of Oromia Education Bureau and 'Lem Ethiopia', environmental education has been found to be on a similar status in the schools in the zone. Accordingly, two (29%) of the seven senior secondary schools, in the zone, were randomly selected. The schools were Darge Senior Secondary School in the capital Nekemte, and Gidda Ayana Senior Secondary School, at Gidda Ayana town, which is about 110 kms away from Nekemte and has more rural pattern of life.

There were 1111 students in both schools, of which 586 were in Gidda Ayana and 525 in Darge Senior Secondary Schools. The reference to the document of environmental education clubs of the schools showed that about 356 students have been the members of environmental education club through out their experiences in the schools. In order to get

fair representatives from each school stratified random sampling was used. Then, using systematic random sampling, 233 (21%) of the students were selected on the basis of their achievement in grade 10 owing to absence of their achievement record for grade 11 at the time of data collection. In this sample, 94 were from environmental education club members and 139 were from those who were not.

Parents of all these students were purposely included in the study in that they could provide information on what their sons /daughters were (and are) doing at home in disseminating environmental education.

Moreover, 15 grade eleven home-room teachers, 2 unit leaders, 2 deputy-directors, 2 environmental education club leaders and 2 club member teachers were included in the study to rate the activities of the students in and around the school. On the whole, 23 teachers took part in it.

3.3. Variables Included in the Study

Independent Variables- include accessibility to mass media, awareness of environmental issues, attitude toward the conservation of resources, residence, and being environmental education club member or not.

Dependent Variable- Practice in the dissemination of environmental education.

3.4. Data Gathering Instruments

Questionnaire, interview and documentary analysis were the means employed at large to procure the required information. Informal interview was made with students, teachers and parents to get more confirming information in informal talks, as those of colleagues on different matters. Moreover, observation of some aspects of environmental education activities in the school was another means of data collection.

3.5. Development of the Instruments

3.5.1. Instruments for Collecting Data from the Students

The instruments include awareness test, attitude inventory and questionnaire dealing with sources of environmental education for the students, and with factors hindering the dissemination of environmental education.

Before preparing the items, the relevant literature was thoroughly revised, selected senior secondary school subjects-agriculture, home-economics, geography and biology-were assessed to see inclusion of environmental education contents. These subjects were those indicated to include more elements of environmental education (Zemedu and Beletu, 1994).

After preparing the questionnaire, 5 judges were made to determine the appropriateness of each item. The judges were one qualified and experienced authority from the Ethiopian Environmental Protection Authority, two trained environmental education club leaders at senior secondary schools of which one is geography teacher and the other is agriculture teacher; and two senior graduate students at Addis Ababa University from Psychology and Curriculum and Instruction departments. The judges evaluated the items on a five point scale where by five is allotted to the most appropriate item and one to the least appropriate one. The mean score for each item was calculated. Using the median as a dividing line, that is 3, those items whose mean below 3 were dropped. On the basis of the results of the judgement, 3 items found to be inappropriate were dropped (see appendix F). The questionnaire was then translated from English to Amharic with the help of English and Amharic department graduate students to make it easier for students' understanding.

To determine the reliability of the items, a pilot-test was conducted on 40 randomly selected grade 11 students in Ambo Comprehensive Secondary School from the

and Social science streams. Of these, 10 students were members of environmental education club.

Results of the pilot-test, using split-half method of calculating reliability (Cronbach's α), the reliability of the awareness questions, attitude inventory, and identifying the sources of environmental information were found to be 0.60, 0.65 and 0.60 respectively. These coefficients of reliability show the consistency and reliability of the items to be employed for the study. Then, after making some modifications on the basis of the pilot-test, 18 awareness questions, 10 attitude inventory items, 10 major items having sub-items dealing with the sources of environmental information for the students and 18 items indicating factors hindering the environmental education with open-ended question were used to collect data from students.

Questionnaire for Teachers

Data collected from teachers dealt with what students could do in and how to disseminate environmental education. It was prepared on the basis of a survey and in consultation with environmental education club leaders and principals of secondary schools. Then, the same judges used in evaluating the questionnaire of students judged the questionnaire, and it was pilot-tested on eight

with factors hindering the dissemination of environmental education were implemented in collecting data (see appendix D and F).

3.5.3. Interview for parents

Interview items were prepared in consultation with authorities from the Ministry of Agriculture, particularly Development Agents (DA's) who have close relationship with the farmers in their day-to-day practice. Then, five judges, one each from the Ethiopian Environmental Protection Authority, environmental education club leaders at senior secondary schools, and senior graduate students of Educational Psychology at Addis Ababa University; and two Development Agent workers evaluated the items. On the basis of the judgement, two questions found to be inappropriate were dropped (refer to appendix F).

The questions were translated into the local language, that is, "Afaan Oromoo" by the researcher and with the help of two senior undergraduate "Afaan Oromoo" minoring students at Addis Ababa University.

To see the reliability of the instrument, a pilot-test was conducted on 8 parents, 4 of which were parents of environmental education club member students, from Ambo and the nearby rural areas. The reliability of the items was found to be 0.90. Then, some minor modification was made in the wording and the arrangement of items.

Finally, 32 structured interview items and 4 open ended questions were used to collect information from the parents. The questions dealt with the extent to which students share information they have about environmental issues to their parents, the practical activities they could perform at home related to environmental conservation, and sources of environmental information for parents.

3.6. Data Gathering Procedure

After the instruments were screened and the samples identified, the following steps were followed to collect the data. The questionnaire for the students and their parents were correspondingly given similar codes. On the day of administering, the sample students were made to come all together with the help of deputy directors and unit leaders of the schools. Then, after a brief orientation was given by the researcher on the purpose and how of filling the questionnaire, it was administered in a well-controlled form to the students with no time imposition for completing it. Finally, the students were made to write their names, code of the questionnaire they filled and their address on a separate sheet distributed to them.

Documentary analysis of environmental education club activities was carried out. Moreover, informal interviews were conducted with 4 students and 4 teachers in order to obtain additional information concerning the problem (see appendix J).

Questionnaire for teachers was administered after they were given orientation on how to fill it.

Interviewing the parents was done by 8 trained data collectors, four each at Nekemte and Gidda, and for 11 and 15 days at respective sites. The training of the interviewers lasted for three half days for a group consisting of four unemployed secondary school graduates, one primary school teacher and three Development Agents. In collecting data, the maximum daily coverage by individual interviewer was four persons on the occasion of meetings encountered at two places throughout the data collection to nil on some days, with an average two persons a day. The collection of the data covered areas from which students were daily making to-and-for travels for their schooling. The codes and the addresses filled on the questionnaire (see appendix C), and on a separate sheet of paper including their names, helped the data collectors to get the

parents of the students. Following the students on their way home from school and seeking co-operation from Developments Agents to gather parents together were the other means for contact. In case of students who came from distant areas and reside at the near by areas of the schools, individuals who host them or live with them were interviewed.

In conducting the interview, first, questions that elicit 'Yes' or 'No' answers were forwarded. Where the response 'No' was given by the respondent, then the interviewer put 'X' under the alternative which indicates the absence of the activity in question. But, with the response 'Yes', the question 'how often?' was followed to identify the frequency at which the activity was carried out. Any additional information given by the parents was recorded. Moreover, an intensive interview was conducted by the researcher with four parents. However, due to many reasons like absence of parents at home, unwillingness of few mothers to provide information in the absence of fathers, and wrong addresses given by some students-out of 233 parents expected to be met, only 206 of them were contacted. Moreover, 6 students wrongly filled the questionnaire. Finally, the responses of 200(18%) of the students with that of their respective parents were used in the study. From these, 90 students were from environmental education club members and 110 were from the other wise.

On the basis of the achievement of the students in grade 10, the mean scores for both club members and non-members were calculated, and found to be 68.61 and 68.91 respectively, with no significant group difference on t-test (see table 2 on Page 46)

3.7. Statistical Methods Used in Analysing the Data

The data, after being collected through the above mentioned procedures, were analysed using the following statistical methods: class interval, mean, range, frequency and percentage-to find out the level of awareness, attitude and the extent to which

students participate in activities that enhance the dissemination of environmental education to the community.

T-test was then employed to determine the difference in the mean scores of students in awareness, attitude and practices in the dissemination of environmental education between environmental education club members and non-club members, and so done for that between students from urban and rural areas.

The intercorrelation among the independent variables (awareness of environmental issues and attitude toward the conservation of resources), and the correlation between each independent variable and the dependent variable (practice in the dissemination of environmental education) was done using correlation matrix, for it is known to be a quick visual method of significant correlations (Hammond and Cullagh, 1978:239). It is possible to distinguish groups of variables where correlations shown to be significant.

The means used by the students to disseminate environmental education was reached from the analysis of parents' and teachers' ratings of students' activities using percentage.

Finally, the results of documentary analysis made on the activities of environmental education clubs, and the results of the interviews with club leaders, parents, teachers and the students were incorporated in the presentation of the data. In this study, $P < 0.05$ was used to show statistical significance.

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CHAPTER FOUR

RESULTS AND DISCUSSION

This chapter deals with the presentation and analysis of data collected from students, teachers, parents and from the documents of environmental education club.

4.1. Results of the Study

The presentation of the results of the study starts with the description of the characteristics of the respondents shown in Table 1 below.

TABLE 1

The Characteristics of Sample Students

N	Category									
	Sex		E.E.C.M	N.C.M	U	R	Department		Age Range	Mean Age
	M	F					N.S	S.S		
200	151	49	90	110	68	132	122	78	15-25	17.8
100%	75.5	24.5	45	55	34	66	61	39		

N= Number of Samples S.S= Social Science
 U= Urban E.E.C.M= Environmental education club members
 R= Rural N.C.M= Non-club members
 N.S= Natural Science

As can be seen from the above table, out of 200 sample students 151(75.5%) are male while 49(24.5%) are female. Again out of the 200, 90(45%) belong to E.E.C.M where as 110(55%) belong to N.C.M. Residence wise, 68(34%) come from urban area and 132(66%) from rural area. Departmentally, 122(61%) are from Natural Science and 78(39%) from Social Science. Hence, the majority of the sample students are from the

rural so that it seems appropriate to get the necessary information for the study which predominantly deals with rural related environmental issues. Moreover, the grouping into E.E.C.M and N.C.M helps in making comparison between the two groups so as to see the impact of the club on the students' awareness, attitude and practice in disseminating environmental education. To see the equivalence of the two groups in their classroom achievement, a comparison was carried out as can be observed from Table 2 below

TABLE 2

The Comparison in Classroom Achievement of Sample Students at the end of Grade 10

Group	N	sum of scores	Mean	S	DF	tc	tt	Significance
E.E.C.M	90	6175.27	68.61	8.95	198	0.28	1.96-1.98	Insignificant
N.C.M	110	7587.8	68.91	9.8				

S= Standard deviation DF(Degree of Freedom)= N_1+N_2-2 , tc=t-calculated
tt= t-tabulated

As can be observed from Table 2, the difference between the mean scores of the two groups is found to be insignificant at $t < 0.05$. Hence, the two groups seem to be similar in their overall classroom achievement in grade 10.

The description of the characteristics of sample students is followed by the presentation of the responses of the students which begins with students' rating of sources of environmental education as follows:

TABLE 3

4.1 Sources of Environmental Education for the Students as Rated by the Students Themselves

No	Sources	Frequency at which Information is Gained									
		Always		Often		Some times		Rarely		Never	
		No	%	No	%	No	%	No	%	No	%
1	Subjects taught	9	4.5	61	30.5	108	54	22	11	-	-
2	Co-curricular activities	5	2.5	65	32.5	103	51.5	27	13.51	2	2.94
3	Mass media	8	4	43	21.5	79	39.5	52	26	18	9
4	Invited Guests	2	1	15	7.5	86	43	78	39	19	9
5	The community in which students live	23	11.5	58	29	78	39	35	17.5	6	3
6	Environmental education club leader	18	9	66	33	50	25	45	22.5	21	10
7	Methods used in teaching learning process	6	3	50	32.5	76	38	65	32.5	5	2.5

* For details of the elements under each source refer to appendix C

The major and minor sources of environmental education are identified using the total number of respondents to alternatives (always, often and sometimes), which indicates the number of the students and the frequency at which they gained environmental information from the mentioned sources. Accordingly, 178(89%) of the students rated the subjects taught in the schools as the major sources of environmental education followed by co-curricular activities (173 or 86.5%), then by the community in which they live (159 or 79.5%), the activities of environmental education club leader (134 or 67%),

methods of teaching-learning process (132 or 66%), mass media (131 or 65%) and the least one as invited guests (103 or 51.52).

As to the inclusion of environmental education elements in the curriculum in relation to the dissemination of environmental education, the researcher looked into agriculture and home-economics for grade 9-10, geography and biology for grade 9-12. Using the textbooks and syllabuses, the following major observations were made.

In geography, topics like the interdependence between man and his environment, the uneven distribution of natural resources and its impact on the economic activities of man in different regions of the world, man's exploitation of resources and its impact on the very existence of the natural resources and population growth were treated. Generally seen, it seems that much attention was given to the areal distribution of resources and their exploitation, and less to the conservation aspect except few notable topics as in geography for grade 10 (unit 3, page 83-108). The topics include conservation of land and soil, conservation of air and water and conservation of wildlife and natural vegetation.

In biology, topics such as discovering the environment, balance of nature (the relationship between animals and plants, food chain, food web, cycles in nature), habitat, ecosystem, reproduction, population growth, family planning (in limited areas of biology for grade 12), contraceptive methods and conservation of resources (vegetation, soil, water and wildlife) were incorporated. In agriculture, conservation of natural resources (soil, water, forest and wildlife) were included.

In home-economics, sanitation practices, health, nutrition, home management and consumer education were incorporated.

From the observation, the following major problems were detected:

- i. Lack of adequate contents initiating outdoor activities or problem solving approach. Even in units where conservation of natural resources are relatively well-treated, less attention is given to practical activities for the students to practise by themselves or at least to share with others orally. For example, in biology for grade 12(unit 17, pp.103-135) and geography for grade 10(unit 3,pp.83-108) such problems are observed.
- ii. Failure in using local and tangible examples. For instance, day-to-day experience shows that too many young plant are carelessly destroyed in the countryside of Ethiopia in order to get a single wood for immediate use. In such cases, simple examples of conservation could be taken like the use of dead branches of trees for firewood rather than cutting down the living ones, or using the left overs of the already cut down trees, or caring for the nearby trees while cutting the needed one. It seems of much relevance that examples of this kind be taken into consideration in Ethiopian schools rather than giving much attention to the reuse of spare parts of machines which are less accessible to the majority of Ethiopian students.
- iii. Incongruence between time allocated and the subject to be covered in a year. According to the time allocation of senior secondary schools, the period allotted to the subjects encompassing more elements of environmental education was found to be less in relation to the allotment to other subjects despite the vastness of the subjects as with agriculture and geography for grade 10. Similarly, in grades 9 and 10, home-economics and agriculture are respectively allotted one and two periods per week, as opposed to the higher amounts allotted for English, Maths, and Amharic (i.e, 5, 4 and 3 respectively).

These are some of the major curricular factors that negatively affect students' participation in the dissemination of environmental education.

The second major sources of environmental education as rated by the students were co-curricular activities in which club activities are included. Among the clubs functioning in senior secondary schools, the one which is pertinent to this study is environmental education club (nature club or environment club).

Environmental education clubs were established in the schools recently with the support of non-governmental organizations (EWNHS and 'Lem Ethiopia') which, as observations made of both sides proved, persisted in provisions of materials such as watering cans, hoe, seeds, seedlings, bulletins and news letters to the clubs.

As other clubs in the schools, environmental education club was organized on the basis of the interest of the students. An interview with the students revealed that students had much interest to be members of the club. This can be substantiated by the increase in the number of club members within a short period of time as seen in the documents. This is shown below.

TABLE 4

The Members of Environmental Education Club for the Latest Two Academic Years in the Sample Schools

School	1995/96			1997/98		
	M	F	T	M	F	T
Gidda Ayana Senior Secondary School	69	38	107	113	69	182
Darge Senior Secondary School	61	37	98	105	70	175

In spite of this increase in club members, many students expressed their disappointment for lacking the same opportunity. Club leaders, however, attribute the

case to shortage of materials, trained man power and time to handle large number of students in a single club. As observed from the document of the club, both theoretical and practical activities were carried out regularly, being respectively scheduled for once per week and every two weeks at Gidda Ayana and Darge Senior Secondary Schools. Of the theoretical means through which club members become familiar with environmental issues, the teaching by the club leader and sometimes by invited guests particularly from MOA could be mentioned. Some of the topics treated were:

- i- The degradation of natural resources,
- ii- Natural resource management,
- iii- Population growth and sustainable development,
- iv- Energy resource utilization and
- v- Global warming, desertification, pollution of terristerial and acquatic environments and the loss of biodiversity.

As to the dissemination of environmental education to the others, the following were obtained from the document of the club:

- i- Teaching the school community using school mini-media
- ii- Teaching the surrounding community through meetings, literature on the 'World Environment Day-June 5' . On this occasion, students who won literature competition were given prizes.
- iii- Film show to the school community

Among the practical activities, the major ones were:

- i- Planting seedlings, preparation of nursery beds,
- ii- Beautification of the school compound,
- iii- Participation in harvesting crops, and
- iv- Field trip to natural forest area, and agricultural research center at Bako (the case of Darge).

Documentary analysis and interview with the club leader implied that invited guests were one of the major sources of environmental education for the students.

However, it appeared contradictory that students rated these agents as their least sources, which might require further investigation.

The other source of environmental education is the community. Teachers' and students' ratings, however, indicated that this source has not been exploited by the school due to the absence of a strong established relationship between both sides (see table 21). Concerning the need to utilize community resources, Brace in Binns (1995) recommended the use of local knowledge and local resources so as to bring change in a given locality. Binns himself, strongly argues that, "the best way to learn about a village is from the people who live there"

As can be seen from table 3, the activities of environmental education club leader were rated as average and/or among the least sources of environmental education, which may imply the limitation of the activities of the club leader to the club.

In general, the proportion of students' rating of the mentioned sources as more frequent (always and often) sources of environmental information was found to be relatively less.

4.1.2. Students' Awareness of Environmental Issues

The awareness items include 18 questions which have three alternatives each: 'Correct (C)', 'Incorrect(I)', and 'I do not know (DK)' which are respectively allotted 2, 1 and 0 marks for statements requiring positive responses. The marking is, however, reversed for items requiring negative responses. The alternative "I do not know" helps to identify those who are alien to environmental issues raised in the test. The maximum possible score one can get is the product of the number of items and the maximum score allotted to each item (that is, $18 \times 2=36$) while the minimum is $18 \times 0=0$. The score allotted to 'I do not know' ($18 \times 1=18$) was used as a dividing line to identify those who are aware

of the environmental issues and those who are not. The scores for items requiring negative responses become equal to those items requiring negative responses when reversed.

TABLE 5

Students' awareness of Environmental Issues

Alternatives	Number of Respondents	%
Incorrect	3	1.5
I do not know	2	1
Correct	195	97.5

Table 5 above shows the summary of students achievement in awareness test. As can be seen from the table, 195(97.5%) of the students were found to score above the dividing line. Hence, the students seemed to be familiar with fundamental environmental education concepts.

TABLE 6

The Comparison Between Environmental Education Club Members and those who are not, and Between Urban(U) and Rural (R) students

Groups	N	Sum of scores	Mean	S	DF	tc	tt	Significance
E.E.C.M	90	2442	27.13	3.06	198	3.93	1.96-1.98	Significant
N.C.M	110	2794	25.4	3.14				
U	68	1812	26.64	3.01	198	1	"	Insignificant
R	132	3578	27.1	3.2				

Table 6 shows that there is significant difference between environmental education club members and those who are not in their awareness of environmental issues, as which club members scored better than the non-club member at $P < 0.05$. On the other hand, no significant difference was observed between urban and rural students.

4.1.3. Students' Attitude Toward the Conservation of Resources

The attitude scale has 10 items with 5 alternatives for each items indicating the degree of one's feelings toward the conservation of resources. The alternatives are 'strongly agree', 'agree', 'undecided', 'disagree' and 'strongly disagree' with allotted marks 4, 3, 2, 1 and 0 respectively. The marking will be reversed for statements requiring negative responses. Using the score allotted to 'Undecided' (i.e, $2 \times 10 = 20$) as a dividing line, the attitude one has can be categorized as favourable or unfavourable (Best and Kahn (1989)).

TABLE 7

Summary of Students' Attitude Toward Conservation

Responses		No of Respondants	%
Favourable Attitude	Strongly agree	185	92.5
	Agree		
	Undecided	8	4
Unfavourable Attitude	Disagree	7	3.5
	Strongly disagree		
Total		200	100

According to Table 7 above, 185 (92.5%) of the students have expressed favourable attitude toward the conservation of resources. From this, it seems that students feel concerned about the deterioration of resources. On the other hand, 8(4%)

responded that they had not clear cut position while 7(3.5%) showed negative or unfavourable attitude toward conservation. This may emanate either from lack of awareness or the immediate benefit associated with exploitation of resources at the expense of their conservation.

The attitude of students toward conservation can be influenced by a number of factors. Here, participation in environmental education club and residence were considered.

TABLE 8

**The Comparision of Students' Attitude Toward the Conservation of Resources
Between Club and Non-club members, and Between Urban (U) and Rural (R)
Students**

Groups	N	Sum of Scores	Mean	S	DF	tc	tt	Significance
E.E.C.M	90	2542	28.24	3.73	198	5	1.96-1.98	Significant
N.C.M	110	2814	25.58	3.7				
U	68	1786	26.27	3.89	198	2.5	"	Significant
R	132	3661	27.73	3.82				

Table 8 shows that there is statistically significant difference between environmental education club members and those who are not, where environmental education club members expressed more favourable attitude. This may be due to the more access rural students have to the causes and the consequences of the destruction of natural resources.

4.1.4. Students' Practices in Disseminating Environmental Education

As mentioned earlier in chapter three, both teachers and parents were made to rate students participation in activities that enhance the dissemination of environmental education

4.1.4.1. Teachers' Ratings of Students' Activities

As can be observed from Table 9 below, 23 teachers participated in the rating of students. Of these 21 are male and 2 are female with the majority (13) in the age group (31-40). Moreover, the sample teachers are those who are expected to have close relationship with a day-to-day activities of the students in schools.

TABLE 9

The Characteristics of Sample Teachers

No	Sex		Age			Educational status		Responsibility				
	M	F	20-30	31-40	41-50	12+ 2	12+ 4	H.R.T	U.L	D.D	E.E. C.L	E.E. C.M
23	21	2	8	13	2	11	12	15	2	2	2	2
100%	91.31	8.69	34.78	56.52	8.69	47.83	52.17	65.2	8.7	8.7	8.7	8.7

H.R.T= Homeroom teacher

E.E.C.L= Environmental education club leader

U.L= Unit leader

E.E.C.M= Environmental education club member

D.D= Deputy director

Below is the list of activities and teachers rating of students participation in the activities (see Appendix D).

TABLE 10**Types of Activities Carriedout by the students as Rated by Teachers**

<u>Activities in the school</u>		Score for	Score for	
		<u>E.E.C.M</u>	<u>N.CM</u>	<u>Mean</u>
1.	Preparation of nursery beds-----	69	47	58
2.	Planting seedlings -----	73	55	64
3.	Caring for plants -----	64	43	53.3
4.	Caring for available resources (desks, board, window. . .)-----	54	46	50
5.	Participation in theatres or dramas concerned with environmental education-----	36	24	30
6.	Participation in the sanitation of the classroom and the school compound ingeneral -----	59	41	50
7.	Terracing -----	13	13	13
8.	Harvesting crops if there are -----	42	37	39.5
9.	Teaching the surrounding community through theatres and dramas by inviting them to school -----	30	28	29
10.	Teaching the school community about environmental problems through literature, meetings, theatres or using mini-media-----	65	43	54
<u>Activities in the Near by Areas of the School</u>				
11	Planting trees-----	65	48	56.5
12.	Sanitation of the surrounding:			
	A) Digging waste disposal pits -----	42	27	34.5
	B) Draining stored water -----	36	20	28
	C) Cleaning streams -----	40	31	35.5
	D) Collecting waste materials and burning or burying them-----	50	38	44

Activities in the Nearby Areas of the School

		Score for <u>E.E.CM</u>	Score for <u>N.C.M</u>	Mean
13.	Harvesting crops -----	70	58	64
14.	Teaching the surrounding community about environmental problems through meetings, dramas and theatres -----	49	31	40
15.	Terracing -----	13	11	12
16.	Students willingness to participate in the above mentioned activities-----	<u>65</u>	<u>45</u>	<u>55</u>
	Sum=	935	686	810.5
	Mean=	49.21	36.11	42.66

. Mean score for E.E.C.M = 49.21

. Mean score for N.C.M = 36.11

. Mean score for in school activities for both groups= 44.1

. Mean score for activities in the nearby areas of the schools for both groups=
56.5+34.5+28+35.5+44+64+40+12+55 = 39.31

The possible score ranges from 0 to 76. The highest score indicates activities in which students have good participation while the lowest score indicates activities in which students' participation is poor. As can be seen from the mean score of the students given above, the mean score of environmental education club members is greater than that of non-members. Moreover, the mean score of students activities in the school is greater than their activities in the nearby areas of the schools. These were substantiated by the parents rating of students activities in the surrounding community(see tables13,14,15).

To determine the activities of the students as good or poor, an interval scale was used for each alternatives (see Apendix I).

TABLE 11

Summary of Teachers ' Ratings of Students' Activities

Alternatives	Class Interval	No of the mean scores falling in the interval	%
Very Poor	0 _____ 15	2	10.53
Poor	16 _____ 31	3	15.79
Fair	32 _____ 47	5	26.32
Good	48 _____ 63	7	36.84
Very good	64 _____ 79	2	10.5
Total		19	100

According to Table 11, teachers rated students activities such as planting seedlings in the school compound, and harvesting crops, among the activities carried out in the community, as very good. The preparation of nursery beds and ' plant project' run by environmental education club members in the schools were observed by the researcher (see Appendix K) . The activities of the club in these areas were found to be encouraging. According to the interview made with the club leaders, terracing has not yet been carried out either in the school or in the nearby areas of the school. Moreover, teaching the surrounding community through theatres and dramas is very limited to occasional days as on the 'World Environment Day'.

In general, in the surrounding community, except some activities such as planting trees, harvesting crops (owing to the unseasonal rainfall of 1997) and teaching the surrounding community on the celebration of the 'World Environment Day,' a visible activity is not much carried out by the students (interview with teachers and students-see appendix J).

4.1.4.2. Parents' Rating of Students' Activities

The table below gives the characteristics of sample parents. Accordingly 200 parents were involved in providing information on the practices of the students in the community

TABLE 12

The Characteristics of Sample Parents

N	Sex		Res		Job				Educational Status				M.S			
	M	F	U	R	G.E	F	Me	O	No	<6	7-8	9-12	>12	MA	S	O
200	181	19	68	13 2	22	129	42	7	88	56	10	32	14	192	2	6
100%	90.5	9.5	34	66	11	64.5	21	3.5	44	28	5	16	7	96	1	3

Res= Residence

F= Farmer

G.E= Government employee

M.S= Marital Status

Me= Merchant

S= Single

U= Urban

MA= Married

O= Others

R= Rural

As can be observed from the table, the majority (129 or 64.5%) of the sample parents are farmers. Moreover, about 88(44%) are illiterate while 56(26%) are with educational status below grade 6.

Items dealing with students practices involved parents of the students from both urban and rural areas. Hence, owing to the differences in urban and rural environments, urban dwellers were asked to rate their sons/daughters on questions that are only relevant to them. Items that are irrelevant to urban dwellers are indicated by *(see appendix E). Among 21 practice questions, only 10 are relevant to urban dwellers. As a result, the rating for urban students was based on the 10 items. On the other hand, all the 21 items

are relevant to rural people. Since environmental problems in the zone under study were mainly of rural in nature, much attention was given to rural environmental problems.

The rating was conducted in the following way: for the activities that were always done by the students=4 marks, often=3; sometimes=2; rarely=1 and never=0. The interval system indicated in appendix I, was used to determine the number of respondents in each alternative.

TABLE 13

Rating for Rural Students

Responses Indicating the Frequency at which Students do the Activities	No of Respondents	%
Always	-	-
Often	3	2.27
Sometimes	27	20.45
Rarely	63	47.73
Never	39	29.55
Total	132	100

As can be seen from Table 13, only 3(2.27%) of the parents responded that rural students often participate in activities that enhance the dissemination of environmental education to the parents while 27(20.45%) observed that students sometimes participate in the activities in question. The majority, 63(47.73%) reported a rare participation while 39(29.55%) indicated the absence of participation by the students.

TABLE 14

The Comparison in Students' Practices of Disseminating Environmental Education to the Surrounding Community Between Club Members and Non-Club Members for Rural Students

Group	N	Sum of scores	Mean	S	DF	tc	tt	Significance
E.E.C.M	50	1076	21.52	7.21	130	4.51	1.96-1.98	Significant
N.C.M	82	1234	15.08	7.91				

The comparison in Table 14 shows that rural students in environmental education club participated in the dissemination of environmental education more frequently than their non-club member counterparts. The difference is found to be significant at $P < 0.05$. The rating for the urban is as follows.

TABLE 15

Rating for Urban Students

Responses Indicating the Frequency at which Students do the Activities	Number of Respondents	%
Always	-	-
Often	-	-
Sometimes	3	4.41
Rarely	46	67.65
Never	19	27.94
Total	68	100

In case of urban students, 46(67.64%) of the parents rated that students rarely practise the dissemination of environmental education and only 3(4.41%) reported that their sons or daughter sometimes exhibited participation in the activities in question. Hence, the participation of urban students in disseminating of environmental education is found to be rare. The comparison between environmental education club members and those who are not also shows the absence of a significant difference between the two groups as can be observed in Table 16 below.

TABLE 16
The Comparison Between E.E.C.M and N.C.M Urban Students in Disseminating Environmental Education.

Group	N	Sum of scores	Mean	S	DF	tc	tt	significance
E.E.C.M	40	492	12.3	3.84	66	0.65	1.98-2.00	Insignificant
N.C.M	28	320	11.42	4.00				

So far, the comparison is within the urban or the rural group of students. It is also necessary to know whether there is difference in the practice of urban and rural students. In doing so, common items for both urban and rural students were used (see appendix E to identify the items).

TABLE 17
The Comparison Between Urban and Rural Students in Disseminating Environmental Education.

Group	Sub-groups	N	Sum of scores	Mean	S	DF	tc	tt	significance
E.E.C.M	Urban	40	470	11.72	3.62	88	0.23	1.98-200	Insignificant
	Rural	50	595	11.90	3.72				
N.C.M	Urban	28	302	10.8	3.68	130	2.35	1.98-200	Significant
	Rural	82	1041	12.7	3.69				

Table 17 shows that there is no significant difference in mean score of urban and rural environmental education club member students. On the other hand, there is a significant difference in the practices of urban and rural non-environmental education club member students in which rural students showed more frequent performance than urban students. This difference may result from the more contact rural students have with natural resources in their day-to-day practice. The absence of difference between urban and rural club member students could be attributed to the influence of the club.

4.1.5 The Means Students Use in Disseminating Environmental Education

The activities that are carried out by the students can be categorized into two major groups: oral transmission of information and practical activities. The number of items used to collect information from the parents on what rural students do in the community was 21. Of these, 14 questions deal with what students could do individually in transmitting information orally (10 questions) and practically (4 questions). The other 7 questions deal with what students could carry out in group. From these, one deals with oral delivery of information and six with practical activities.

The items for individuals' oral transmission of information are 1A, 1B, 1C, 1D, 1E, 1F, 1G, 2A, 2B and 3. 4A, 4B, 4C and 4D were used to measure individuals' practical activities. Item for a group oral transmission was 5E while 5A, 5B, 5C, 5D 5F and 5G were used for practical activities (see appendix E).

TABLE 18

The Means used by Rural Students in Disseminating Environmental Education

Frequency indicating the occurrence of the activity	Individually						In Group					
	Oral		Practical		Mean		Oral		Practical		Mean	
	N ₀ R	%	N ₀ R	%	N ₀ R	%	N ₀ R	%	N ₀ R	%	N	%
Always	-	-	-	-	-	-	-	-	-	-	-	-
Often	-	-	1	0.76	0.5	0.38	-	-	-	-	-	-
Sometimes	22	16.67	20	15.15	21	15.91	10	7.58	2	1.52	6	4.55
Rarely	56	42.42	69	52.27	62.51	47.35	37	28.03	40	30.3	38.5	29.2
Never	54	40.91	42	31.82	48	36.36	85	64.39	90	68.18	87.5	66
Total	132	100	132	100	132	100	132	100	132	100	132	100

N₀R= Number of respondents

As can be seen from Table 18, 22(16.67%) of the parents responded that students sometimes participate in oral transmission of environmental information individually while 20(15.15%) expressed that rural students sometimes participate in practical activities. Thus, the participation of the students in individual oral transmission of information and practical activities is almost similar. In case of group activities, only 6(4%) of the parents indicated the presence of students' participation. The absence of group student activities in rural areas could be attributed to the absence of any responsible body to organize and mobilize the students for such activities.

In general, be it individually or in group; orally or practically, rural students participation in the dissemination of environmental education was found to be low.

The Case of Urban Students

Ten questions were used to collect information from urban dwellers concerning the means urban students use to disseminate environmental education to the community.

Seven items were used to collect information from the parents on what students could do individually, of which 2 (4A and 4B) deal with practical activities and the rest 5(1A, 1B, 2A, 2B, and 3) with oral transmission of information. Moreover, of the 3 items dealing with students group activities, 2 (5B and 5C), and 1 (5E) deal with practical and oral transmission of information respectively.

TABLE 19

The Means Used by Urban Students in Disseminating Environmental Education

Frequency indicating the occurrence of the activity	Individually						In Group					
	Oral		Practical		Mean		Oral		Practical		Mean	
	N _Q R	%	N _Q R	%	N _Q R	%	N _Q R	%	N _Q R	%	N _Q R	%
Always	-	-	-	-	-	-	-	-	-	-	-	-
Often	-	-	-	-	-	-	1	1.47	-	-	0.5	0.74
Sometimes	3	4.41	2	2.94	3.5	5.14	2	2.94	-	-	1	1.47
Rarely	32	47.06	36	52.94	33	48.53	23	33.82	31	45.59	27	39.71
Never	33	48.53	30	44.12	31.5	46.33	42	61.77	37	54.4	39.5	58.08
Total	68	100	68	100	68	100	68	100	68	100	68	100

As can be observed from Table 19, 31.5(46.33) of the parents on average responded that urban students never participated in either practical activities or oral transmission of information individually. Moreover, 39.5(58.08%) of the parents reported the absence of group participation in disseminating environmental education. In students' group activities, the oral transmission of information seems to be a little bit better than practical activities. This may be due to the coming together of the students and parents on the celebration of the ' World Environment Day' in which students participate in transmission of information through literature and short dramas. In this case, rural students may take part in through environmental education club. In general,

the participation of the students in using either oral or practical means was found to be very low. For details of the activities under both oral and practical means, see appendix E. From the consecutive presentation of students' practices in disseminating environmental education to the community, environmental information gained by the community from the students was found to be low. That means, the schools, in the zone did not seem to play a significant role in serving as sources of environmental information for the surrounding community. If this is the case then, what about the out of school sources? In an attempt to have a relative overview of the contribution of the school seen in relation to out of school sources, a comparison was made between school and out of school sources using mean and t-test on the basis of the parents' ratings.

In considering schools as sources of information, activities that could bring together the school and the community, and students' participation in practices of environmental education dissemination were taken. The mean score of the sources was calculated. The out of school sources in this case included teaching by environmental related governmental organizations such as Ministry of Agriculture (MOA), Ministry of Health (MOH) and non-governmental organizations (example- 'Lem Ethiopia,' EWNHS), religious organizations, leaders of peasant or urban dwellers associations, neighbours and mass media. The summary of the comparison is presented below.

TABLE 20

The Comparison Between School and Out-of School Sources

Sources of Environmental Education	N	Sum of scores	Mean	S	DF	tc	tt	Sig
School related activities: - What students transmit to their parents orally - What students do practically either individually or in group - The dissemination of information as a result of the relationship between the school and the community through dramas, theatres or meetings	200	216.02	1.07	0.52	398	3.15	1.96- 1.98	S i g n i f c a n t
Out of School activities: - Teaching by MOA, MOH, NGOs or information transmission through ' Kebele', religious organizations, neighbours and mass media.	200	249.84	1.24	0.56				

Table 20 shows that out of school sources provide environmental information more frequently than the schools. The difference is found to be significant at $P < 0.05$. But, when generally seen, the accessibility of the community to environmental education is found to be low. This could be understood when we compare the observed frequency at which parents gained environmental information with the maximum possible frequency at which they could gain environmental information. The maximum possible frequency

'always' is with allocated mark 4, and the least one is the absence of information totally, that is zero. Hence, the obtained mean score for all sources is $1.07+1.24/2= 1.15$, which indicates parents were rarely accessible to environmental information from the sources enumerated.

The less accessibility of the parents to environmental information through the school could be attributed to the weakness of the relationship between the school and the community as indicated in the teachers' and students' ratings of some of the major factors hindering the dissemination environmental education. Moreover, it may be related to the school limited activities of environmental education club members, and the less carry over of information to the parents by the students.

4.1.6 Factors Hindering the Dissemination of Environmental Education as Rated by the Students and Teacher

Concerning factors hindering the dissemination of environmental education, teachers were asked to rate some of the major possible problems contributing to the impediment of environmental education dissemination.

TABLE 21
Factors Hindering the Dissemination of Environmental Education as Rated by
Teachers

Items	Ranks									Total
	1	2	3	4	5	6	7	8	9	
1	(14)	8	1	-	-	-	-	-	-	23
2	6	⑧	4	1	1	1	1	-	1	23
3	1	2	⑨	6	1	1	1	1	1	23
4	-	-	1	⑦	6	3	3	3	-	23
5	1	1	1	1	4	3	⑤	6	1	23
6	-	-	-	-	2	4	4	⑨	4	23
7	1	1	3	4	④	1	4	1	4	23
8	-	1	-	1	2	1	5	2	(11)	23
9	-	2	4	3	3	⑧	-	1	1	23
Total	23	23	23	23	23	23	23	23	23	23

The figures (numbers) given at the intersection point of items and the ranks indicate the number (frequency) of the raters. To determine the rank for each item, read the frequency along the row and take the highest frequent value of the row which is also the highest for the column. For instance, for item number 1, when read along the row, the highest frequent value is 14, and there is no other frequency along this row under the other column which is greater than 14. Thus, the rank for item 1 is 1.

According to the rating of teachers, the following factors took priority in becoming stumbling-blocks to the dissemination of environmental education:

- i. Lack of material and financial support,
- ii. Shortage of time to carry out practical activities due to the over crowded nature of the already existing curriculum,

- iii. Weak relationship between the school and the community,
- iv. Lack of initiation, coordination and cooperation among different subject teachers,
- v. Lack of enough orientation seminars on the area, followed by items 8, 5, 6, 8 (see appendix D).

Teachers also listed down the following additional major factors in their responses to an open ended question to be hindrances to the dissemination of environmental education:

- i. Lack of water for growing seedlings and watering young plants (this problem is mainly observed in Gidda Ayana Senior Secondary School where students were forced to fetch water from a well (observed by the researcher-see appendix K)
- ii. Club members do not share their experience to others (also blamed by non-environmental education club members).
- iii. Educational fieldtrips and other practical activities could be carried out during vacation owing to the shortage of time, but financial problems impeded the implementation of this plan.
- iv. Lack of awareness of the significance of outdoor activities both by students and parents.

TABLE 22

Factors Hindering the Dissemination of Environmental Education as Rated by the Students

Item	Ranks										Total
	1	2	3	4	5	6	7	8	9	10	
1	33	(44)	30	9	28	19	17	6	9	5	200
2	16	19	20	20	16	(32)	36	26	11	4	200
3	(90)	34	30	11	17	9	4	3	1	1	200
4	6	11	14	12	26	24	(47)	26	16	18	200
5	12	26	18	29	(47)	26	19	13	6	4	200
6	2	2	17	15	26	23	24	(38)	28	25	200
7	9	12	14	(70)	10	24	10	23	8	20	200
8	3	9	10	2	7	13	22	31	38	(65)	200
9	1	9	4	8	11	11	19	21	(75)	41	200
10	28	34	(43)	24	12	19	2	13	8	16	200
Total	200	200	200	200	200	200	200	200	200	200	200

* Use the same procedure used in table 21 to read

* Read the item and then the encircled figure, and identify the rank of the item.

According to students rating, item 3 was ranked to be the major problem followed by items 1, 10, 7, 5, 2, 4, 6, 9 and 8, (see appendix C) to know the items. The major problems as perceived by the students are:

- i. Financial and material problems to run practical activities,
- ii. The method of teaching that does not initiate the learners for conservation of resources,
- iii. Shortage of time to run practical activities,

- iv. Weak of relationship between the school and the community, etc.

In their responses to an open-ended question, students listed the following as major factors hindering the dissemination of environmental education:

- i. Less opportunity to be a member of environmental education club,
- ii. Less attention given to environmental education by teachers,
- iii. Shortage of skilled man power,
- iv. Lack of mass education,
- v. Poverty which enforces people to do an activity threatening to their environment and themselves. A discussion made with a group of village people makes this idea vivid.

The researcher arrived at the village at the very moment of the agreement reached among the village people to clear a forest along the stream they use for drinking. After understanding the issue, the researcher told them the advantages they were to lose like the loss of wood for firewood and construction, and how the purity of the stream would be affected. The villagers did not disagree on these points. However, they stated that its negative effects outweighed its advantages by being a habitat for wild animals which may harm their crops and domestic animals. After a prolonged argument with the villagers, the researcher ended up with unfortunate result as the villagers decided to clear the forest.

In this argument, one important lesson learnt was how it is difficult to convince people to conserve resources without solving their immediate problem related to the environment. Moreover, the counter-arguments made by some villagers who inhabit relatively farther from the forest site (and hence are less affected by wild animals) shows how people relate environmental matters to their own benefit.

From this one can infer that people relate the conservation of resources with the immediate benefit they associate with the resources.

On the other hand, concerning the extent to which they share their knowledge of environmental education to others, about 30% of the students responded that they rarely did it.

TABLE 23

Students' Self Report on the Extent to which They Share Their Knowledge of Environmental Education to Others

Alternatives	No of Respondents	%
Always	-	-
Often	3	1.5
Sometimes	167	83.5
Rarely	30	15
Never	-	-

Students' self report also supports the rare participation of the students in the dissemination of environmental education.

Some of the major factors cited by the students to contribute to this were:

- i. Sharing school experience to the community is not the culture of our education,
 - ii. Methods of teaching that do not initiate for sharing experience to the community,
 - iii. Shortage of time to cover school work, and others(see to appendix C,Part v),
- In general, lack of material and financial support, shortage of time, and weak relationship between the school and the community were rated as the major factors hindering the dissemination of environmental education by both teachers and the students.

4.1.7. The Relationship Among the Major Variables in the Study

The relationship among the major variables in this study is a matter of concern. Hence, the intercorrelation among the two independent variables awareness of environmental issues (AW) and the attitude toward conservation of resources (AT), and the relationship between each independent variable and the dependent variable, that is, practices in the dissemination of environmental education (PR) was presented using correlation matrix. The matrix displays the coefficients of correlations and the probability at which the correlations are significant.

TABLE 24
Correlation Matrix
N= 200

	AW	AT	PR
AW	1.00 P=-		
AT	.5406 P.000	1.00 P=-	
PR	.1937 P=006	.1404 P=.047	1.00 P=-

* two tailed significance

At $P < 0.05$, the correlation between the variables is found to be as follows:

From the correlation matrix, the probability (P) at which there is a significant correlation between the variables is given. Accordingly, if the probability given is < 0.05 , there is a significant correlation between the variables.

As can be observed from the correlation matrix, awareness was found to have a positive significant correlation with attitude and practices in the dissemination of environmental education. That means, students who had better awareness of environmental issues expressed more favourable attitude toward the conservation of resources, and there by, exhibited better practices in the dissemination of environmental education to the community.

Similarly, positive significant correlation was observed between attitude and practices in the dissemination of environmental education.

In general, the two independent variables (awareness and attitude) were found to have positive relationship with practices in the dissemination of environmental education.

4.2. Discussion

The sources of environmental education are the bases for the awareness, attitude and the dissemination of environmental education to the surrounding community. From those included in the study, students rated subjects taught in the schools as the major sources of environmental education. This seems to go with the findings of curriculum auditing committee(Zemedede and Beletu, 1994) that contents of environmental education have been incorporated in the national curriculum.

As suggested by the committee, environmental education concepts have been included in varying degrees in Ethiopian national curriculum with more prevalence in agriculture, biology, geography and home-economics(*ibid.*). Though, the inclusion of some environmental education elements in the above mentioned subjects was confirmed in this study, it does not seem adequate enough to equip students with the necessary skills that would enable them to act for the environment. Much of the elements were presented in the curriculum for lecture and discussion topics, giving less attention to outdoor activities. Evidences of this can be seen in geography for grade 10(PP.83-108) and biology for grade 12(PP. 103-135). They do not enhance field activities which could allow students to discover resources in their natural settings and also communicate with the surrounding community, who may reasonably have more experience on the locality.

Leal Filho in Hale (1993), Huwang(1994), Beletu and Yosef (1990) have recommended the use of field studies in environmental education. Geogre's research cited in Knapp (1972), Pizzini (1979), Jernigan and Wiersch (1978) also support the idea that outdoor educational activities produce significant change in attitudes toward the environment.

Commenting on the situation of field studies in developing countries, Leal Filho in Hale (1993) stated that the underdevelopment of field studies in developing countries results primarily from the lack of the appropriate educational elements in the curriculum both in terms of content and in context of teaching program and learning styles. In line with the comment of Leal filho (*ibid.*), the observed subjects were found to be defficient of environmental education contents dealing with field studies. Even in some areas where some elements were included in the curriculum (as in biology for grade 10), students were not found practising them. The researcher's personal experience and interviews made with some teachers also confirm that teachers often do not make students come through such learning exprience. Teachers commonly attribute the case to time, material and financial constraints. However, observations made prove that one needs to go no farther to get ample environmental elements that could meet the purpose.

There are sites of degraded land, land covered with sparsely standing big trees indicating the remnants of natural forest or water bodies and the like within a short distance from the school compounds which can be observed without any demands for transport or sophisticated materials. Moreover, students have easy access for exchange of information with the community, if they are initiated to do so.

The shortage of time to cover the subjects is one of the points of argument among the teachers. In line with this, Miheret (1996), from his study on social science courses in senior secondary schools, has similarly argued that there is incongruence between the time allotted and the portion to be covered in a year. In reality, with traditional method of lecturing and writing notes on the board on the same topic, there could be time constraint to cover the subjects. The impact of this factor could be minimized by employing different methods of teaching seeing their compatibility to the ability of the students. Otherwise, it appears of necessity that ways of restructuring the curriculum be devised.

As observed by the writer of this paper, the subjects incorporating more elements of environmental education were allotted less time. With these conditions, it seems difficult to implement environmental education, the effectiveness of which requires field activities or out door activities.

Seen content wise, too, it was observed that contents dealing with local examples on how to conserve resources and students' practices in the dissemination of environmental education appear to be inadequate.

As to the new inputs in environmental education since the introduction of the New Education and Training Policy of 1994, teachers perceived the establishment of environmental education clubs, the provision of written materials (bulletins, news letters) and materials for practical activities (seeds, seedlings, watering cans and the likes), and the occasional workshops to the club leaders as the major new inputs in the schools. On the other hand, the observation made to senior secondary school curriculum showed that

no curricular change has taken place recently eventhough it has been underway beginning from primary level with a view to include senior secondary school curriculum.

As revealed in responses of the teachers and students, lack of relationship between the the school and the community is one of the major obstacles to the dissemination of environmental education. Moreover, the practice of using invited guests as a source of environmental information was found to be low. This may emanate from the less attempt made by the school community to bring the school and the surrounding community together.

Some of the environmental education activites carried out in the schools like the preparation of seedbeds, the growing of plants under the plant project run by the club and the use of school mini-media to teach the school community is appreciable. But these good beginnings seem to be limited in the school as seen from the responses of the parents. The club members attribute this limitation to the shortage of time and the immaturity of the club. The raising of envrionmental education as a distinct entity at club level in schools may be a recent beginning in the area eventhough the presence of environmental education concepts in the curriculum is not a present day phenomenon. This being the case, failure of students to inform their parents, even orally, is indicated by the parents. The inadequacy of the curriculum contents in initiating students participation in community affairs, the methods of teaching that do not involve students' participation in community (see appendix C) and the wrong assumption that equates education to only what is learnt in the classroom and what is read from the books might have contributed to the less participation of the students in exchanging information about environmental issues with the surrounding community.

The observation that members of environmental education club showed better performance, than the non-members, by showing greater score in awareness test, more favourable attitude toward the conservation of resources and more frequent practice in the

dissemination of environmental education, could be attributed to the exposure they had to environmental education through the club.

Moreover, the better performance observed of rural students on attitude test and practices in disseminating environmental education to the community could be seen in relation to the experience the rural students have on the effects of the deterioration of natural resources like the loss of soil fertility on agricultural productivity, the loss of grazing land on rearing domestic animals and the like.

Generally seen, senior secondary school grade 11 students in the zone seem to be familiar with the basic concepts of environmental education and expressed favourable attitude toward the conservation of resources. On the other hand, the practices of the students in disseminating environmental education was found to be low. The failure in practice as compared to performance on awareness and attitude tests may be due to the fact that putting one's awareness and feelings into practice requires more sacrifice and dedication.

In line with this, Rokeach (1968), suggested that even if favourable attitudes are developed, these may not lead to the desired behaviour owing to either lack of skills, lack of opportunity or lack of belief in being reinforced for the expected behavioural change (locus of control).

Among the major factors that teachers and students rated as obstacles to the practice of disseminating environmental education, the following could be mentioned:

- i- Material and financial constraints,
- ii- Shortage of time to run practical activities, and
- iii- Weak relationship between the school and the community.

When we consider the first factor, (i.e, financial and material constraints), while it is essential to have material and financial resources at adequate level, they are not decisive factors in environmental education, the nature of which is learning about the environment

from the environment for the environment (UNESCO-UNEP E.E.S 17, 1985; Yosef, 1995). This means, we use resources from the environment to learn about the environment and then use our knowledge of the environment for the welfare of the environment.

Eventhough the dissemination of environmental education was not implemented to the level of students' awareness of and feelings for the issues, a positive significant correlation was found among the awareness, attitude and practices of environmental education dissemination. This to mean that students who have better performance in awareness test showed more favourable attitude and relatively better practice.

This finding seems to coincide with the widely held position that the knowledge of the environment leads to favourable attitude toward the environment (Gross and Pizzini, 1979; Jernignan and Wiersch, 1978). It also goes with the general principle of education that awareness leads to the formation of attitudes which in turn influence one's practice (Ramsey and Rickson, 1977).

Generally grade 11 students' participation in disseminating environmental education to the surrounding community was found to be low. In comparing schools as sources of environmental education with out of school sources, the out-of school sources were rated as providing environmental information to the community more frequently than the school. But generally seen the accessibility of the community to environmental education was found to be low.

CHAPTER FIVE

5. SUMMARY, CONCLUSION AND RECOMMENDATIONS

This chapter presents the summary, conclusions and recommendations.

5.1 Summary

The purpose of this study was to assess the extent to which senior secondary school students, grade eleven students of East Wellega zone in particular, disseminate environmental education to the surrounding community. To this end, questions addressing issues of students' awareness of environmental concerns, attitude toward the conservation of resources and practices in disseminating environmental education were raised.

Questionnaire, interview and documentary analysis were employed to procure the required data. The data was collected from 200 randomly selected grade 11 students with their respective parents and 23 purposely selected teachers on the basis of their responsibilities that associate them with the day to day activities of the students in the schools.

Different statistical tests were employed to analyse the data. Percentage and class interval were used to determine the awareness, attitude and practices of the students. T-test was computed to carryout comparisons between groups. The intercorrelations among the variables were identified using correlation matrix. The results of the analysis of the data showed that:

- i. Students rated subjects taught in the schools as the major sources of environmental education for them. However, an assessment made on selected subjects indicated that they do not seem to be with adequate contents dealing with fieldworks and students' communication with the surrounding community, which

- inturn may negatively affect the dissemination of environmental education to the community.
- ii. The students seem to be familiar with the basic environmental education issues and expressed a favourable attitude toward the conservation of resources with less practices in its dissemination. Seen in relation to their awareness and attitude, students' practices in both oral transmission of information and practical activities were found to be low.
 - iii. Club members exhibited better performance on awareness test and expressed more favourable attitude toward the conservation of resources and more frequent practices in disseminating environmental education than the non-club members.
 - iv. Rural students expressed more favourable attitude and exhibited more frequent practices than urban students.
 - v. There is a positive significant correlation between students' awareness and practices as the case between students' attitude and practices.
 - vi. Students were rated to use limited means in disseminating environmental education. Parents' ratings implied that students oral transmission of information has been rarely occurring in the form of informal talks between students and parents at home and through meetings on the ceremony of the ' Environment Day'. Practical activities like planting and caring for trees and sanitation practices were also reported to occur rarely.
 - vii. Teachers and students rated financial and material shortages, limited time and weak relationship between the school and the community as some of the major factors hindering the dissemination of environmental education.
 - viii. The dissemination of environmental education seems to be fruitful if it integrates practical activities which could solve the immediate problems of the local people related to the environment.

5.2 Conclusion

In light of the findings, the following conclusion is made:

The rapid deterioration of Ethiopian environment, particularly of the rural environment necessitates raising the awareness of the people. In this, students are expected to play a significant role for they are relatively more accessible to environmental education through the subjects they learn and the clubs in which they participate (particularly environmental education club). The study revealed that participation in environmental education club appears to have a positive impact on the dissemination of environmental education eventhough it has been experienced on a limited scale.

5.3 Recommendations

On the basis of the findings and conclusions, the following recommendations are made:

- i. The result of the study have implication for curriculum designers to give emphasis to environmental education contents that would enable students to take actions in disseminating environmental education. Thus, contents dealing with outdoor education and students' participation in community affairs related to environmental issues are in order.
- ii. The results of the study also have an implication for governmental and non-governmental organizations to strengthen environmetnal education clubs. The strengthening of environmental education clubs in schools may take the form of training more teachers or students so that it is possible to participate all interested students in the club. In doing so, participating students from each section; organizing sub-clubs at local levels in schools, and using them as instigators of

the dissemination of environmental education in their respective localities could help in widening the sphere of influence of the club.

- iii. Strengthening the relationship between the school and the surrounding community. The school community has to work for creating a strong link between the schools and the surrounding community. This could occur through the preparation of theaters, meetings, students' participation in practical activities beneficial to the community (example, cleaning streams, constructing roads, planting trees, harvesting crops or through involving parents in club activities).
- iv. Since students' practice in disseminating environmental education is lacking, it appears advisable that the teachings emphasize this area. In this case, teaching methods which encourage students' participation in problem solving activities at home, in which parents could participate, may enhance the dissemination of environmental education to the community.
- v. An attempt in awareness raising need to be accompanied by practical activities that could solve the immediate problems of the community related to the environment. For instance, in the areas studied, one of the major causes of deforestation is the clearing of forest for the cultivation of maize. Discussions made with the local people implied that no logic or reasoning would stop them from clearing the forest unless alternative means are sought. The alternatives may include the provision of a selected variety of seeds that can be grown on the farmers' plots; the provision of fertilizers at a lower price or teaching the people to adopt other variety of crops instead of maize.
- vi. Since environmental education is a broad area that requires research, the writer of the paper urges researchers to work on this area in depth emphasizing on the following:
 - A) The curriculum organization to be used in Ethiopian schools (single subject or multi-disciplinary?)
 - B) The teaching methods to be employed,
 - C) The means for disseminating environmental education to the community,

- D) Environmental issues in relation to gender, and
 - E) The impact of mass media on the awareness, attitude and practices of disseminating environmental education.
- vii. Finally, the worsening situation of environmental problems through time and its complexity requires an immediate response from all of us to save our only planet-the earth.

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APPENDIX A

Guiding Principles of Environmental Education

Environmental education should

- . consider environment in its totality-natural and built, technological and social (economic, political, cultural- historical, moral, aesthetic);
- . be a continuous life long process, beginning at the pre-school level and continuing through all formal and non formal stages;
- . be interdisciplinary in its approach, drawing on the specific content of each discipline in making possible a holistic and balanced perspective;
- . examine major environmental issues from local, national, regional and international points of view so that students receive insights in to environmental conditions in other geographical areas;
- . focus on current and potential environmental situations while taking in to account the historical perspective;
- . promote the value and necessity of local, national and international cooperation in the prevention and solution of environmental problems;
- . explicitly consider environmental aspects in plans for development and growth;
- . enable learners to have a role in planning their learning experiences and provide an opportunity for making decisions and accepting their consequences;
- . relate environmental sensitivity, knowledge, problem solving skills and values clarification to every age but with special emphasis on environmental sensitivity to the learner's own community in early years;
- . help learners discover the symptoms and real causes of environmental problems;
- . emphasize the complexity of environmental problems and thus, the need to develop critical thinking and problem solving skills;
- . utilizing diverse learning environments and a broad array of educational approaches to teaching learning about and from the environment with due stress on practical activities and first hand experience.

APPENDIX B

The comparative survey of the Incorporation of Environmental Education in to School Curricula of the following countries was carried out:

1. Colombia
2. Fedral Republic of Germany
3. India
4. Jamica
5. Japan
6. Kenya
7. Kuwait
8. Malaysia
9. Nepal
10. Sirlanka
11. Thailand
12. Union of Soviet Socialist Republics
13. Venezuela

APPENDIX C

CODE _____

**ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES
FACULTY OF EDUCATION****Questionnaire to be Filled by Grade 11 Students**

DIRECTIONS: This study is devoted to investigating the extent to which senior secondary school students disseminate environmental education to the surrounding community. In doing so, this part of the questionnaire focuses on the sources of environmental education for the students, students awareness level and attitude toward environmental issues, and some of the problems that hinder the students from disseminating environmental education to the community. The information required from you will be used for academic purposes. Hence, you are kindly requested to complete the questionnaire carefully and honesty. In responding, follow the instructions, complete all the questionnaire because looking over a single item could make the study invalid. Do not write your name on the paper.

PART I- BACKGROUND INFORMATION

Respond to the following questions by writing your answer on the space provided.

1. School _____
2. Your age _____
3. Sex _____
4. Your present address:
Rural Kebele _____
Town _____
House number _____
5. Field of study _____
6. Your average grade point
at the end of grade 10 _____
7. Your club last year _____
8. Your club this year _____

Part II: Identify the correctness of the following environmental education concepts indicating your choice by the sign 'X' from the alternatives ' Incorrect (I); I do not know (DK)' and ' correct (C):

No	Environmental Education Concepts	Alternatives		
		I	DK	C
1	Vegetation, soil, water and animals are interrelated, the existence of one depends on the other			
2	The highest caloric intake is obtained by feeding on tertiary consumers.			
3	It is necessary to stabilize the rate of population growth so as to reduce environmental pollution.			
4	The resources of the earth can support only a limited number of population.			
5	The best method of conserving natural resources is avoiding utilizing them.			
6	Clearing forest for agricultural activities, overgrazing, cutting trees for fuel and construction purposes, and the setting of fire into the forest carelessly are the major causes of deforestation in Ethiopia.			
7	The killing of harmful animals to man does not have any effect on natural balance.			
8	Drought has been the recurrent problem in Ethiopia.			
9	Early marriage, having more than one woman and avoiding the use of birth control are the major causes of population increase in Ethiopia.			
10	At present, the utilization of natural resources is at the rate they can regenerate themselves.			
11	Water pollution occurs as a result of waste disposal from the surrounding by man, the uncontrolled use by domestic and wild animals, and heavy soil erosion.			

No	Environmental Education Concepts	Alternatives		
		I	DK	C
12	The conservation of diverse species of plants is achieved through the conservation of the equatorial rainforest.			
13	The use of water is preferable to the use of coal, natural gas or petroleum as source of energy from conservational point of view.			
14	In Ethiopia, soil loss through erosion is highest on the highlands.			
15	More destruction on vegetation is brought about by domestic animals than wild animals.			
16	Constructing checkdams is the best method of overcoming soil erosion.			
17	Uncontrolled hunting is one of the major causes of the loss of wildlife in Western Oromia.			
18	The depletion of ozone layer and global warming, the destruction of tropical rainforest, air and water pollution are the major global environmental problems of these days.			
19	The best method of avoiding waste materials is throwing them away at a distant place from the residential room.			
20	Crop rotation is one of the easiest method of maintaining soil fertility.			
21	The conservation of vegetation ensures the conservation of soil.			

PART III- Listed below are the sources of environmental education. Indicate the frequency at which you gain environmental education from these sources by putting the sign 'X' under the alternatives given in front of each statement or phrase.

No	Sources of environmental education	Frequency				
		Always	Often	Some times	Rarely	Never
1	Subjects taught:					
	A) Geography, biology, agriculture and home-economics					
	B) English, Amharic, Chemistry and Physics					
	C) Maths, woodwork and business education					
2	Co-curricular activities:					
	A) Meetings or theatres conducted through the initiation of environmental education club					
	B) Practical activities such as the preparation of seedlings and growing plants through the initiation of environmental education club					
	C) Club in which I am a member					
	D) Labour education					
3	Mass media:					
	A) Radio					
	B) Television					
	C) Newspaper					
4	Invited guests from:					
	A) Ministry of Agriculture					
	B) Ministry of Education					
	C) Ministry of Health					
	D) Non-governmental organizations like 'Lem Ethiopia' and EWNHS					

No	Sources of Environmental education	Frequency				
		Always	often	some times	Rarely	Never
5	The community:					
	A) Parents					
	B) Neighbours					
	C) Peers					
6	A) Teaching by environmental education club leader					
	B) Materials brought to the school by environmental education club leader during his participation in workshops					
7	Methods of teaching-learning process:					
	A) Teachers fartherly /motherly/ advice to persuade students for conservation action					
	B) Collecting information on environmental problems from the surrounding community and presenting to the class					
	C) Teachers agitation of the students to transmit environmental information to their parents					
	D) Learning environmental education through lecture in the classroom					
	E) Practising in the field what is learnt in the classroom					

PARTI IV- The following items refer to the attitude of the students toward the conservation of resources. Indicate the degree of your agreement to the statements given below by putting the mark ' X' under the alternative you chose from ' Strongly Agree (SA)', ' Agree (A)', ' Undecided (U)', ' Disagree (D)' and ' Strongly Disagree (SD)',

No	Statements	Degree of your agreement				
		S	A	D	U	SD
1	Whenever I see anyone cutting a tree, whoever he is, I will tell him to plant more instead of what he has cut down.					
2	I would be happy If I were a killer of a lion or if I had a relative who is a killer.					
3	If I become a teacher, I will not make the students do labourious works such as building fences, preparing seedlings and planting trees, cleaning the school compound and the likes.					
4	If I get a little money for survival, I will go deep to rural areas to agitate farmers to conserve resources.					
5	It is the responsibility of the students to inform the community about environmental problems threatening the very existence of man kind.					
6	The resource available at present is enough for me, and I do not worry for the coming generation.					
7	Those individuals who kill harmless animals like Colobus monkey or 'Gureza' should be fined or imprisoned.					

No	Statements	Degree of your agreement				
		S	A	D	U	SD
8	I am a yongester and it is not the time for me to worry about population increase, family planning and the depletion of resources. Let the elders worry about them.					
9	Those animals which serve as sources of food for man should be killed.					
10	I would like to have marriage with more than one man or woman.					

PART V- Rank the following problems you think hinder the dissemination of environmental education. Rank first, the problem you think the most severe; 2nd, the next most severe up to the 11th rank.

1. The method of teaching does not intiate us to disseminate environmental education. _____.
2. The limitation of environmental education elements in the subjects we learn _____.
3. Less attention is given to environmental problems by the society _____.
4. Lack of financial and material support to run practical activities _____.
5. Shortage of water to run practical activities such as the preparation of seedbeds and the growing of seedlings _____.
6. Inadequate support from the school in allocating time and organizing the activity _____.
7. Improper utilization of the allocated money and materials _____.
8. Weak relationship between the school and the community _____.
9. The weakness of environmental education club leader _____.
10. Unwillingness of parents to accept information from us _____.
11. Shortage of time to carry out environmental education activities _____.

If others, list them down:

12. How often do you share your knowledge of environmental education to others?

- A) Always B) Often C) Sometimes D) Rarely E) Never

If your answer to question number 12 is either C, D or E, what are the reasons behind? Rank them according to their importance in influencing you as 1st, 2nd, 3rd, 4th, 5th and 6th.

- A) I was not told to share my experience to others while learning _____
- B) My knowledge of environmental education is not different from what the society knows _____
- C) Sharing what we know is not the culture of our education _____
- D) Shortage of time _____
- E) Lack of interest to share my experience _____
- F) Unwillingness of the parents and the local community to accept information from us _____

If others, write down:

APPENDIX D**ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES
FACULTY OF EDUCATION****Questionnaire to be Filled by Teachers**

DIRECTIONS: The purpose of this questionnaire is to collect information on the extent to which senior secondary school students disseminate environmental education in and around the school with particular reference to grade 11 students. The information required from you will be used for academic purposes. Hence, you are kindly requested to complete the questionnaire carefully and honestly. In responding, follow the instructions; complete all the questionnaire because looking over a single item will affect the study. You are not required to write your name.

PART I. BACKGROUND INFORMATION

DIRECTIONS: Respond to the following questions by writing your answer on the space provided.

1. School _____
2. Your age _____
3. Sex _____
4. Service year _____
5. Qualification _____
6. Subject(s) you teach _____
7. Grade level(s) _____
8. Your responsibility in relation to environmental education _____

PART II. Rate your students participation in activities that enhance the dissemination of environmental education. Do your rating in view of comparing students who are the members of environmental education club as a group and those who are not using the sign 'X' to indicate the degree of their participation as very good (VG), Good (G), Fair (F), Poor (P) and very poor(VP).

Note: If there is a list of an activity that has not yet been carried out, do not rate it; and if you do not know whether the activity is going on or not, mark the question number using sign 'X' .

No	Activities in which students could participate in the surrounding community	Degree of their participation									
		Environmental Education club members					Those who are not				
12	Sanitation of the surrounding: A) Digging waste disposal pits										
	B) Draining stored rain water										
	C) Cleaning streams										
	D) Collecting waste materials and burning or burying them										
13	Harvesting crops										
14	Preparation of dry weather roads or constructing bridges.										
15	Teaching the surrounding community about environmental problems through meetings, dramas or theatres.										
16	Terracing										
17	Students willingness to participate in the above mentioned activities.										

PART III- Rank factors hindering the dissemination of environmental education in general and students participation in particular. The ranking will be from the most serious as ' 1st', the next most serious ' 2nd' . . . 9th.

1. Lack of material and financial support to run environmental education activities_____
2. Time limitation to carry out practical activities, observations and field trips due to the over crowded nature of the already existing curriculum _____
3. Weak relationship between the school and the community_____

- 4. Lack of initiation, coordination and cooperation among different subject teachers _____
- 5. Inadequate initiation or coordination by school administrators _____
- 6. Inadequate initiation or coordination by environmental education club leaders _____
- 7. Lack of enough orientation seminars and workshops _____
- 8. Lack of interest on the part of the students to participate _____
- 9. Lack of co-operation among workers of different ministries _____
- 10. It others, list them down.

APPENDIX E

CODE _____

**ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES
FACULTY OF EDUCATION****Interview to be Answered by Parents of the Students**

The purpose of this interview is to collect information on the extent to which senior secondary school students transmit environmental education to you. The information required from you will be used for academic purposes. Hence, you are kindly requested to answer all the questions carefully and honestly.

In responding to the questions, follow the instructions; respond to all the questions and do not allow writing your name on the paper.

Thank You!

PART I- BACKGROUND INFORMATION

DIRECTIONS: Respond to the following questions by giving your answers to the interviewer or by writing your answers on the space provided.

1. Sex _____
2. Age _____
3. Occupation _____
4. Residence:
 - A) Urban _____
 - B) Rural _____ (indicate by 'X')
5. Educational status _____
6. Marital status: Single _____

Married _____

Divorced _____

Widow/widower _____
7. If not single, how many children do you have _____

PART II- Indicate the frequency of students participation in activities that could enhance the dissemination of environmental education and the sources of environmental education for you using the sign 'X' or by responding to the interviewer's questions.

Note: Questions indicated by '*' do not concern urban dwellers who do not participate in farming while those indicated by '.' do not concern farmers.

No	Activities	Frequency of the occurrence of the activities				
		Always	Oft en	Some times	Rare ly	Nev er
1	My son/daughter/ tells me the negative effect of: A) Having large number of children					
	B) Disposing waste materials in the surrounding					
	*C) Setting fire in to the forest					
	*D) Killing wild animals					
	*E) Ploughing ups and downs along hills					
	*F) Keeping large number of cattle on the same land for a long time					
	*G) Cultivating the same type of crop on the same land continuously					
2	My son/daughter tells me the advantage of A) Planting trees					
	B) Gardening (vegetables, fruits and flowering plants)					
3	My son/doughter reports to me the activities in which he/she participates in school.					
4	My son/daughter participates in: A) Planting trees and gardening					
	B) Cleaning waste materials from the near by of the residential room					
	*C) Blowing out forest fire when there in break out.					
	*D) Cleaning streams					

No	Activities	Frequency of the occurrence of the activities				
		Always	Oft en	Some times	Rare ly	Nev er
5	Students in a group come to our village/town and participate in: *A) Planting trees					
	B) Sanitation of the surrounding					
	C) Digging waste disposal pits					
	*D) Harvesting crops					
	E) Teaching the surrounding community about environmental problems					
	*F) Preparing dry weather roads or constructing bridges					
	*G) Cleaning streams					
Sources of Environmental Information for parents						
6	A) What students inform or perform at home					
	B) Dramas or theatres carried out in the schools concerning environmental education					
	C) Meetings on environmental issues carried out in school					
7	A) Workers from Ministry of Agriculture					
	B) Workers from Ministry of Health					
	C) Non-governmental organizations					
	D) Peasant or urban dwellers association leaders					
	E) Religious leaders					
	F) Neighbours					
8	Mass media A) Radio					
	.B) Newspaper					
	. C) Television					

Respond to the following questions

9. What are the major environmental problems in your locality?
10. Is involving students in transmitting environmental education to the community important?
11. Do students tell you why they plant trees, clean the surrounding if there are such activities carried out by them?
12. Is there any negative effect of students practical activities in the community such as planting trees and terracing?
13. How is the participation of the community in activities of environmental protection?

APPENDIX F

The Result of Item Judgement: Questionnaire for Students

Item	Assigned Judges						Assigned Judges						
	01	02	03	04	05	Mean	Item	01	02	03	04	05	Mean
1	5	5	5	5	5	5	5A	5	5	4	4	5	4.6
*2	3	2	1	1	2	2.2	5B	5	5	2	3	5	4
3	5	4	5	5	4	4.6	5C	5	5	5	5	5	5
4	4	3	5	3	4	3.8	6A	5	5	5	5	5	5
5	4	3	5	4	3	3.8	6B	5	5	4	3	5	4.4
6	5	5	4	5	5	4.8	7A	5	5	5	5	5	5
7	5	5	4	5	5	4.8	7B	4	4	5	4	4	4.2
8	4	4	3	4	3	3.6	7C	5	5	4	5	4	4.6
9	5	4	3	4	3	3.8	7D	5	5	5	5	5	5
10	4	4	4	4	4	4	7E	3	4	3	2	3	3
11	4	3	4	4	5	4	<u>Attitude Inventory</u>						
12	5	4	4	5	4	4.4	1	4	5	4	5	4	4
13	5	4	4	3	3	3.8	2	5	5	5	5	5	5
*14	3	2	2	2	3	2.4	3	5	3	5	4	5	4.4
15	5	5	3	5	4	4.4	4	5	5	5	5	5	5
16	5	4	5	5	5	4.8	5	5	4	4	4	4	4.2
17	3	3	3	3	4	3.2	6	5	5	3	4	5	4.4
18	4	3	5	4	4	4	7	5	4	5	5	5	4.8
19	5	5	5	5	5	5	8	5	3	5	4	3	4
20	5	5	5	5	5	5	9	5	5	3	5	5	4.6
*21	3	2	1	2	3	2.2	10	5	4	3	4	4	4
<u>Sources of environmental education</u>							<u>Factors Hindering Dissemination</u>						
1A	5	5	5	5	5	5	1	5	5	5	5	5	5
1B	5	5	4	4	5	4.6	2	2	3	3	2	4	2.8

Item	Assigned Judges						Assigned Judges						
	01	02	03	04	05	Mean	Item	01	02	03	04	05	Mean
1C	4	3	3	3	4	3.4	3	5	5	3	4	3	4.4
2A	5	5	5	5	5	5	4	5	4	4	4	5	4.4
2B	5	5	5	5	5	5	5	4	4	4	3	4	3.8
2C	5	5	4	5	3	4.4	6	5	5	4	3	5	4.4
2D	5	5	5	5	5	5	7	5	5	5	5	5	5
3A	4	4	5	5	3	4.2	8	5	4	5	4	3	4.2
3B	4	2	4	3	4	3.4	9	5	4	5	5	4	4.6
3C	4	3	4	4	4	3.8	10	5	4	4	5	3	4.2
4A	3	3	3	3	3	3	11	5	4	3	4	3	3.8
4B	4	3	4	4	3	3.6	12	4	3	3	4	3	3.4
4C	3	3	4	2	5	3.4	12A	3	2	3	3	4	3
4D	3	3	5	3	4	3.6	12B	4	4	5	4	4	4.2
							12C	3	4	4	5	5	4.2
							12D	2	3	3	4	4	3.2
							12E	4	5	3	4	3	3.8
							12F	3	3	4	2	3	3

* Items dropped

Questionnaire for Teachers							Interview for parents						
Item	Assigned Judges						Item	Assigned Judges					
	01	02	03	04	05	Mean		01	02	03	04	05	Mean
1	5	5	5	5	5	5	1A	5	5	5	5	5	5
2	5	5	5	5	5	5	1B	5	4	4	3	5	4.2
3	5	5	5	4	4	4.6	1C	5	5	5	5	5	5
4	5	5	3	4	4	3.8	1D	5	5	5	5	5	5
5	4	4	4	4	5	4.2	1E	5	5	5	4	3	4.4
6	5	4	5	4	3	4.2	1F	5	5	4	4	4	4.4
7	5	5	5	5	5	5	1G	5	5	5	5	5	5
8	5	5	4	5	5	4.8	2A	5	5	5	5	4	4.8
9	4	4	4	4	3	3.8	3	5	5	4	3	4	4.1
10	5	5	5	5	5	5	4A	5	4	4	5	4	4.8
11	5	5	5	5	5	5	4B	5	4	4	4	4	4.2
12A	5	4	4	4	5	4.4	4C	5	3	3	2	3	3.2
12B	4	3	4	4	3	3.6	4D	5	5	5	5	5	5
12C	4	4	3	3	4	3.6	5A	3	4	4	4	3	3.6
12D	5	5	5	5	5	5	5B	5	5	4	5	3	4.4
*13	4	3	3	2	4	3.2	5C	5	5	5	5	5	5
14	3	2	1	1	3	2	5D	4	4	4	4	3	3.8
15	5	5	4	4	3	4.2	5E	4	5	4	4	5	4.4
16	5	5	5	4	4	4.6	*5F	3	4	2	2	3	2.8
17	5	4	4	3	2	3.6	5G	5	3	4	2	4	3.6
1	5	5	5	4	4	4.6	6A	3	4	4	4	3	3.6
2	4	5	5	5	5	4.8	6B	4	3	4	4	3	3.6
3	5	5	5	5	5	5	6C	4	3	4	4	4	3.8
4	4	4	4	5	3	4.2	7A	5	4	5	5	5	4.8
5	5	5	4	4	4	4.4	7B	5	4	4	4	3	4
6	5	4	5	5	5	4.8	7C	5	3	2	3	2	3

Questionnaire for Teachers							Interview for parents						
Item	Assigned Judges						Item	Assigned Judges					
7	5	5	5	5	5	5	7D	5	4	5	5	4	4.6
	01	02	03	04	05	Mean		01	02	03	04	05	Mean
8	4	4	4	5	3	4	7E	5	5	5	5	5	5
9	5	5	4	4	4	4.4	7F	5	5	4	5	4	4.6
							8A	5	4	5	4	5	4.6
							8B	5	3	3	2	3	3.2
							8C	4	5	3	4	3	3.8
							9	5	4	4	5	3	4.2
							10	5	5	5	5	5	5
							11	4	3	4	3	2	3.2
							12	3	3	4	3	3	3.2
							*13	4	3	3	2	2	2.8

* Items rejected

APPENDIX G

The Reliability of the Instruments

The reliability of the instruments was computed by split-half method (even-odd) using Spearman Brown formula after finding out the correlation between the scores of the odd and even numbered items.

$$\text{Reliability of Split half (rEO)} = \frac{NEO - \sum E \sum O}{\sqrt{[N \sum E^2 - (\sum E)^2] [N \sum O^2 - (\sum O)^2]}}$$

Where,

E= even-numbered items

O= odd-numbered items

N= number of cases

Σ = summation

$$\text{Reliability of the whole items} = (r_{xx}^1) = \frac{n \times rEO}{1 + (n-1) rEO}$$

Where n= number of splits

$r_{\Sigma O}$ = reliability of the split half.

The Reliability of Awareness Test

$\Sigma E = 1062$	$\Sigma O = 1136$	$\Sigma EO = 30422$
$\bar{E} = 26.55$	$\bar{O} = 28.4$	$\Sigma E \Sigma O = 1206432$
$\Sigma E^2 = 28706$	$\Sigma O^2 = 32986$	N= 40
$(\Sigma E)^2 = 1127844$	$(\Sigma O)^2 = 1290496$	
Standard Deviation(S_1)= 3.57	$S_2 = 4.25$	

$$r_{EO} = \frac{40 \times 30422 - 1206432}{\sqrt{(40 \times 28706 - 1127844)(40 \times 32986 - 1290496)}} = \underline{\underline{0.43}}$$

$$r_{xx}^1 = \frac{0.43}{1 + (2-1) \times 0.43} = \underline{\underline{0.60}}$$

* Similarly done for the other instruments. The reliability coefficient ranges from 0 with no reliability to 1 (completely reliable).

APENDEK H

Formula used for t-test

$$t = \frac{m_1 - m_2}{\sqrt{\frac{S.E}{N_1} + \frac{1}{N_2}}}$$

Where S.E= Standard error

$$t = \frac{m_1 - m_2}{\sqrt{\frac{S_1^2}{N_1} + \frac{S_2^2}{N_2}}}$$

$$DF = N_1 + N_2 - 2$$

Where t= value of t or t_c (t-calculated)

N₁= number of cases in group one

N₂= number of cases in group two

m₁= mean for group one

m₂= mean for group two

S₁= Standard deviation for group one

S₂= Standard deviation for group two

DF= Degree of freedom

If t_c (t-calculated) $> t_t$ (t-tabulated), the difference between the means of the two groups will be significant.

- * t_t (t-tabulated) is obtained from statistical table using the degree of freedom and the alpha used in the study, that is, 0.05.

Appendix I

Formula Used in Determining Class Intervals

$$\text{Number of classes} = \frac{\text{Range (The maximum score-the minimum)}}{\text{Interval size}}$$

Source: Brown and Brown (1983:29)

Taking the case of table 10 (the analysis part, page 58) number of classes required are 5 since there are five alternatives used in the questionnaire. Thus, it becomes

$$\begin{aligned} 5 &= \frac{76 - 0}{X} \\ 5X &= 76 \\ X &= 15.2 \\ &= 16 \end{aligned}$$

The class interval, therefore, is:

<u>Alternatives</u>	<u>Class interval</u>
I do not know	0 _____ 5
Strongly Disagree	16 _____ 31
Disagree	32 _____ 47
Agree	48 _____ 63
Strongly Agree	64 _____ 79

Note: Eventhough the maximum score is 76, it is raised to 79 when setting the intervals to include all the scores in the intervals.

APENDIX J

Interview with Environmental Education Club Leaders

1. How is the participation of the students in environmental education club?
2. What activities have been carried out through your club?
3. To what extent students practise outdoor environmental education activities like the observation of natural resources around the school compound, practical activities in the field, and fieldtrips?
4. How do you communicate with the surrounding community?
5. What does your relationship with other governmental and non-governmental organizations looklike?
6. What new inputs are there in environmental education in your school since the introduction of the New Education and Training Policy?
7. What problems have you faced in running the club activities?

Interview with Teachers

1. What environmentally related activities have been carried out in your school?
2. To what extent students practise outdoor educational activities?
3. How do you see the activities of environmental education club in your school?
4. What new inputs are there in environmental education since the introduction of the New Education and Training Policy either in the curriculum or co-curricularly?

Interview with Students

1. How is the participation of the students in environmental education club?
2. What activities do environmental education club members carryout?

3. How is the relationship between the school and the community?

Interview with Oromia Education Bureau
Environmental Education Department Authority

1. What is the status of environmental education in Oromia?
2. How do you ran environmental education in your region?
3. What does your relationship with other governmental and non-governmental organizations looklike?
4. What problems have you faced in running environmental education?

APPENDIX K

Observation Check list

Factors to be observed	Rating		
	Present	Absent	Remark
The preparation of seedbeds			
The availability of young plants			
Writings initiating environmental educaton			
Terracing			
Water for growing plants			

APPENDIX L

Definition of Some Technical Terms

Depletion- the great reduction in quantity or size of resources

Degradation- the worsening or reduction in the quality of resources

Multidisciplinary- an approach in which environmental education elements or concepts are incorporated in to different subject areas.

Interdisciplinary- covering more than one area of study, that is, integrating elements of environmental education from different areas of the study into a whole.

Biosphere- the world of living organisms, including the organisms themselves and their physical environment. It includes the thin layer of the soil and rocks in which living things are found; the streams, lakes and oceans inhabited by aquatic plants and animals; and the dense layer of the atmosphere.

Ecosystem- all the plants and living creatures in a particular area considered together with their physical environment.

Biological Diversity- variety of living things or diverse species of living things.

Ozone layer- a region in earth's stratosphere that helps to protect the earth from the sun's harmful rays.

Stratosphere- the layer of the earth's atmosphere between about 10 and 16 kilometers above the surface of the earth.

Ecology- is the natural relationship (or the study of the relationship) between plants, animals and people, and the places in which they live.

APPENDIX M

List of Interviewed People

1. Ato Habib (OEB Environmental Education Department Officer)
2. " Moges Worku (Lem Ethiopia)
3. " Getachew (The Fedral Democratic Republic of Ethiopia Environmental Protection Authority)
4. Ato Geremew W/Silassie "
5. Dr. Kidane Abebe "
6. Ato Alemayehu Senbeta (Senior Secondary School Director)
7. " Bekele Fanta (Senior Secondary School Deputy-Director)
8. " Fekadu Chernet "
9. " Getachew Qinati (Environmental Education Club Leader)
10. " Teshome Gemechu "
11. " Yohannes Belachew (Environmental Education Club Member)
12. " Qitessa Waqjira (East Wellega Zone Natural Resorce Conservation and Development Office)
13. Ato Geremew Yadeta (DA)
14. " Fekadu Jaleta "
15. " Dufera Gurmessa (Teacher)
16. " Jemberu Arega "
17. " Gemechu Wirtu (Student)
18. " Demisse Gemechu "
19. " Shiferaw Waqjira (Farmer)
20. " Lemessa Hundie "
21. " Dereje Dhuguma "
22. " Wirtu Dinagde "

APPENDIX N

Koodii _____

Yunivarsitii Finfinneetti
Mana Barnootaa Post-Graajuu'etii
Fakaalti Barnootaa

Gaaffilee Warra Ijoolleetiin Deebi'an

Akeekni gaaffilee kanaa ijoolleen keessan warri mana barumsaa sadarkaa lammaffaa keessatti baratan hangam waa'ee kunuunsa naannoo akka isinitti himan yaada isin irraa fudhachuuf. Yaadni isin irraa barbaadamu dhimma qorannoo barumsaatiif waan ta'eef deebii ishee haqqii taate akka kennitan kabajaan isin gaafadha. Yeroo deebii kennitan, qajeelcha kenname hordofaa; gaaffilee hundaafuu deebii kennaa; maqaa keessan waraqaa irratti hin barreessiina yookiin hin barreessisiina.

Galatoomaa!

Kutaa Tokkoffaa - Waa'ee mataa keessanii kan ilaalu

Qajeelcha - Gaaffilee armaan gadiif deebii keessan namicha isin gaafatutti himuudhaan yookiin immoo ofuma keessanii bakka duwwaa irratti barreessuun deebisaa.

1. Saala _____
2. Umurii _____
3. Jiruu /Hojii/ _____
4. Bakka jireenyaa:
 - A) Magaalaa _____
 - B) Baadiyaa _____ (mallattoo "X" kanaan agarsiisi.)
5. Sadarkaa Barnootaa _____
6. Fuutaniitu moo hin fuune? _____
Heerumitaniitu moo hin heerumine? _____
Waan biraa _____
7. Ijoollee meeqa qabdu? _____

Kutaa Lammaffaa- Kanaa gaditti kan tarreeffaman ammam ijoolleen keessan warri barattoonni waa'ee kunuunsa naannoo akka isinitti himaniifi barumsa waa'ee kunuunsa naannoo eessaa akka argatan kan ilaalanidha. Kanaafuu, filannoolee(yeroo hundaa, yeroo baay'ee, yeroo tokko-tokko, yeroo muraasa(xinnoo), natti himanii hin beekan) jedhan keessaa tokko filadhaatii mallattoo "X" kana saaxinii keessa galchuun agarsiisaa, yookiin nama isin gaafatutti himaa.

Hubachiisa: Gaaffileen mallattoo '*' kanaan agarsiifaman jiraattota magaalaa warra qonnaa irratti hin bobbaane kan hin ilaalle yoo ta'an kanneen mallattoo '.' kanaan agarsiifaman immoo qotee-bulaa kan hin ilaale dha.

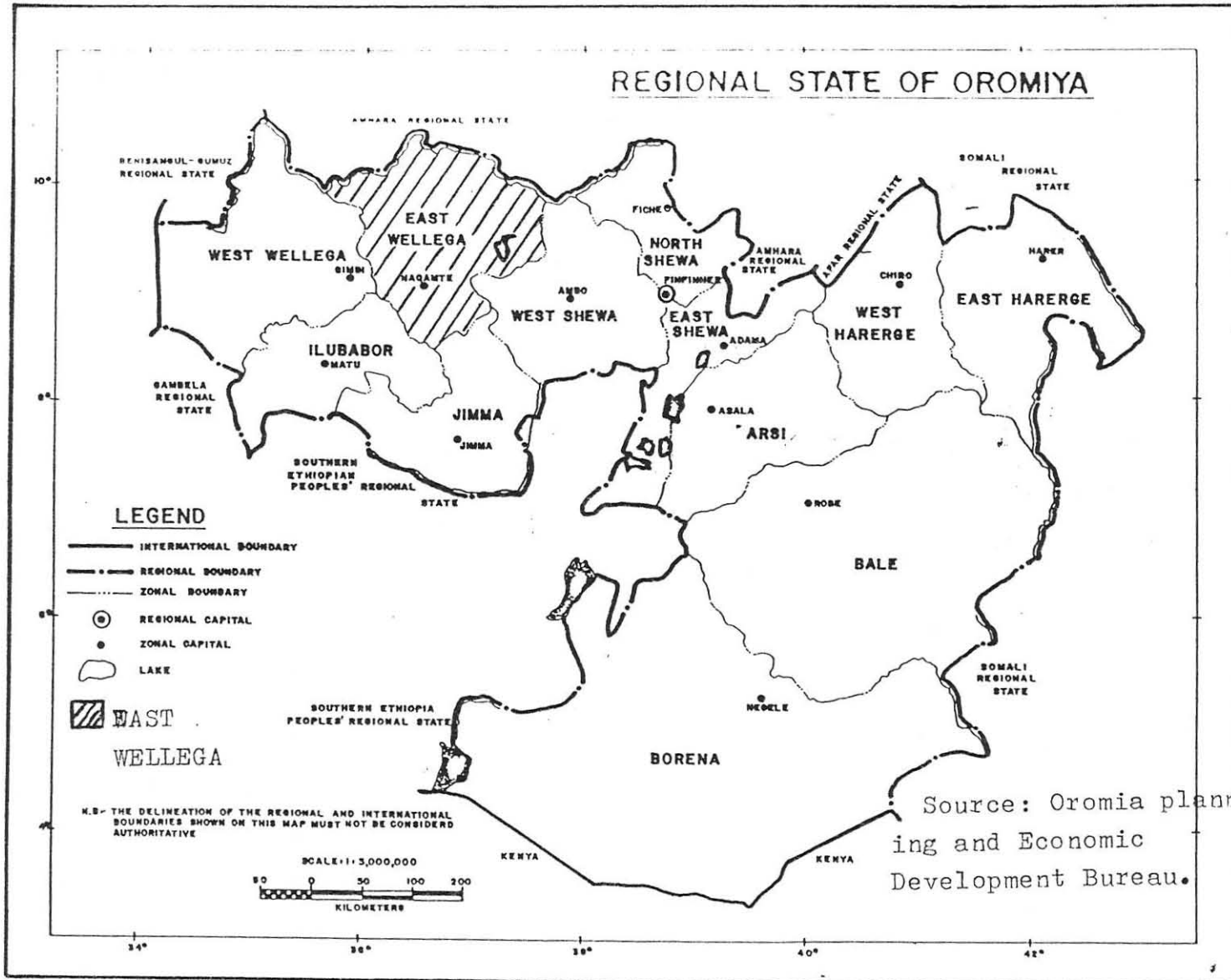
T.L	Waan Barattoonni Isinitti Himuu Yookiin Gochuu Qaban	Ammam akka isinitti himan yookiin hojjetan				
		Yeroo Hundaa	Yeroo Baay'ee	Yeroo tokko tokko	Yeroo muraa- sa	Natti himanii yookiin hojjetanii hin beekan
1	Ilmi/Intalli/ koo kan kanaa gaditti tarreeffaman gochuun miidhaa yookiin rakkina akka fidu natti hima/himti: A) Ijoolleen baay'ee qabaachuun					
	B) Waan xurii ta'e naannootti yookiin bishaan keessatti gatuun					
	*C) Ibdda bosonatti qabsiisuun yookiin bosona gubuun					
	*D) Bineensa lagaa ajjeessuun					
	*E) Lafa tabba irraa-oleefi irraa-gadii qotuun					
	*F) Saawwan baay'ee yeroo dheeraaf bakka tokko irratti tiksuun(ittisuun)					
	*G) Midhaan gosa tokko yeroo dheeraaf bakka tokko irratti irra deddeebi'anii facaasuun					
2	Ilmi/Intalli koo A) Biqiltuu dhaabuun faayidaa akka qabuufi barbaachisaa akka ta'e natti hima/himti					
	B) Fuduraafi kuduraa (vegetables and fruits), biqiltoota abaaboo qaban naannoo manaatti dhaabuun					

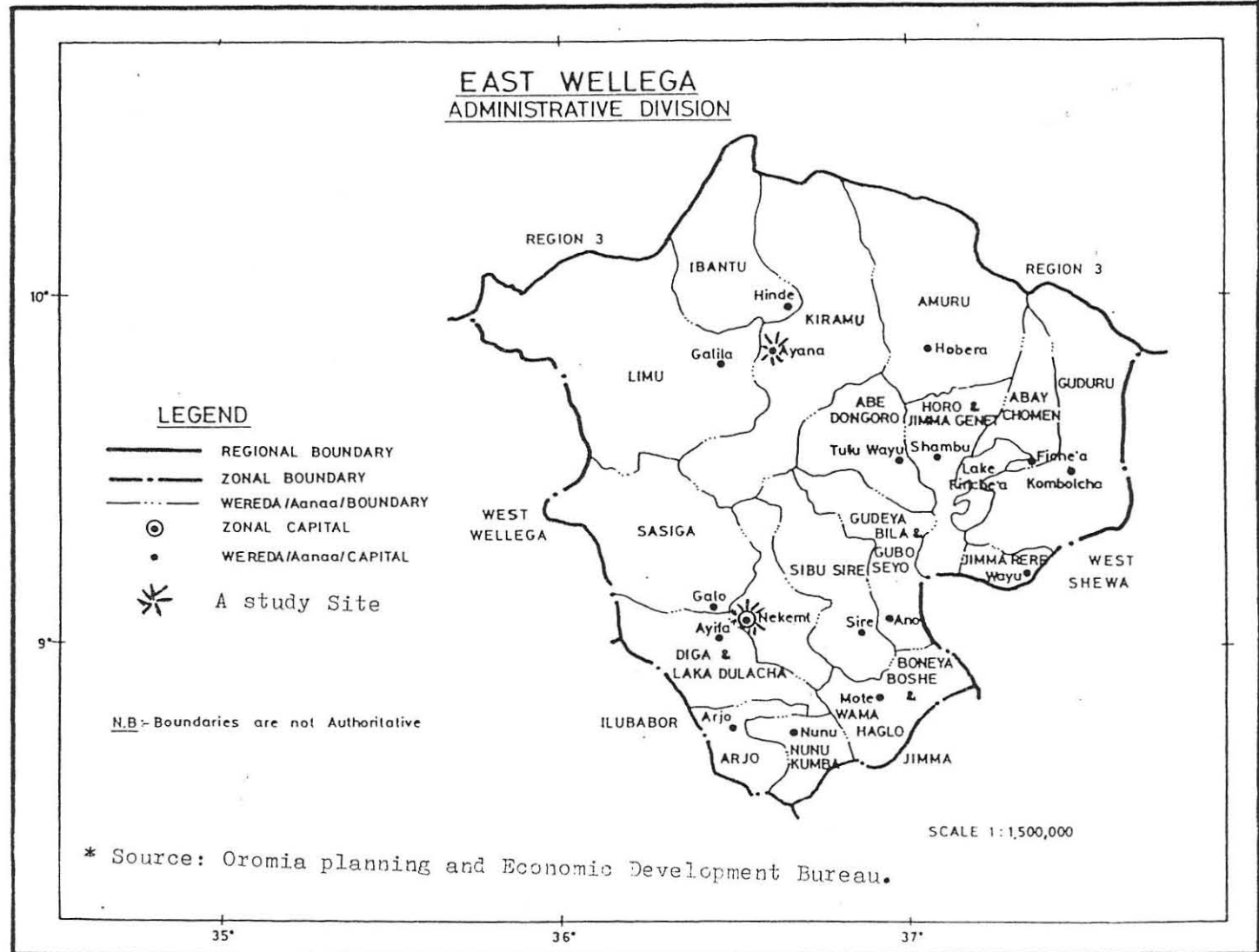
T.L	Waan Barattoonni Isinitti Himuu Yookiin Gochuu Qaban	Ammam akka isinitti himan yookiin hojjetan				
		Yeroo Hundaa	Yeroo Baay'ee	Yeroo tokko tokko	Yeroo muraa- sa	Natti himanii yookiin hojjetanii hin beekan
	barbaachisaa akka ta'e natti hima/himt.					
3	Ilmi/Intalli koo hojii mana barumsaa keessatti irratti hirmaatu/hirmaattu natti hima/himti.					
4	Ilmi/Intalli koo hojii harmaan gadii irratti ni hirmaata/hirmaatti:					
	A) Biqiltuu dhaabuu, biqiltuu naannoo manaa jiran kunuunsuu					
	B) Kosii yookiin gataa naannoo manaa jiru qulqulleessuu					
	*C) Ibibda bosona gubu dhaamsuu					
	*D) Burqaa bishaanii ulqulleessuu					
5	Barattoonni gareedhaan tahnii gara qe'ee (ganda) yookiin magaalaa keenyaa dhufuun					
	*A) Biqiltu dhaabu					
	B) Naannoo qulqulleessu					
	C) Boolla kosiin itti gatamu qotu					
	*D) Midhaan gahe yookiin bilshaate walitti qabu					
	E) Ummata waa'ee kunuunsa naannoo barsiisu.					

T.L	Waan Barattoonni Isinitti Himuu Yookiin Gochuu Qaban	Ammam akka isinitti himan yookiin hojjetan				
		Yeroo Hundaa	Yeroo Baay'ee	Yeroo tokko tokko	Yeroo muraasa	Natti himanii yookiin hojjetanii hin beekan
	*F) Karaa soofuu yookiin riqicha ijaaruu					
	*G) Burqaa Bishaanii qulqulleessuu					
Burqaawwan waa'ee kunuunsa Naannoo warra Ijoolleetiif						
6	A) Waan barattoonii qee'etti natti himan/hojjetan					
	B) Sirbaafi dowwii kunuunsa naannoo ilaalchisee mana barumsaatiin adeemsifame					
	C)Wal-gahii kunuunsa naannoo ilaalchisee mana barumsaatiin adeemsifame					
7	A) Hojjetoota Biiroo Qonnaa					
	B) Hojjetoota Biiroo Eegumsa Fayyaa					
	c) Hojjetoota Miti-mootummaa					
	D) Hoggantoota waldaa qotee bulaa yookiin jiraatoota magaalaa					
	E) Hoggantoota waldaa amantii					
	F) Hollaa koo					
8	Meeshaalee wal-qunnamtii ummataa:					
	A) Reediyoo					
	. B) Gaazexaa					
	. C) Televiziinii					

Gaaffilee Armaan Gadiif Deebii kenni.

9. Rakkinni naannoo baay'inaan naannoo keessanitti mull'atu maalfa'i?
10. Barattoonni waa'ee kunuunsaa naannoo ummata barsiisuu keessatti hirmaachisuun barbaachisaa dha jettanii yaaduu?
11. Barattoonni biqiltuu dhaabuu, naannoo qulqulleessuu fi kan kana fakkaatan keessatti ni hirmaatu yoo ta'e, maaliif akka hojjetan isinitti ni himuu?
12. Barattoonni waan akka biqilttuu dhaabuu, bohoo lolaa ittissu yoo ummata keessa dhufanii hojjetan rakkina fidu qabaa?
13. Naannoo kunuunsuu irratti hirmaanaan ummataa maal fakkaata?





APPEDIX P

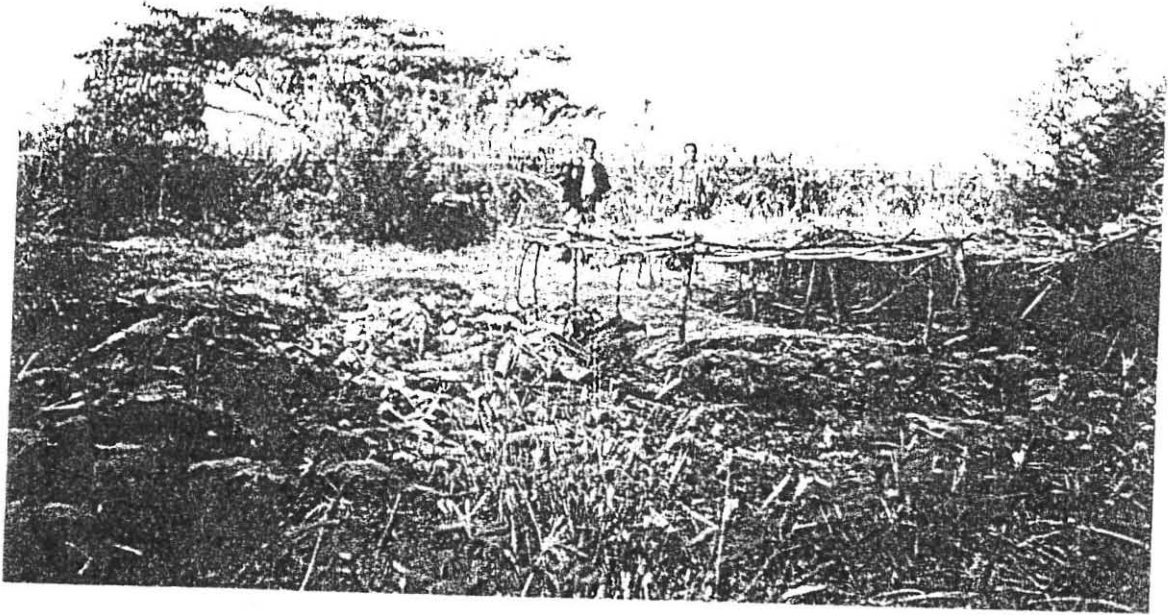
E.E.C.M. students while
Practising in the Field
in Darge S.S.S.



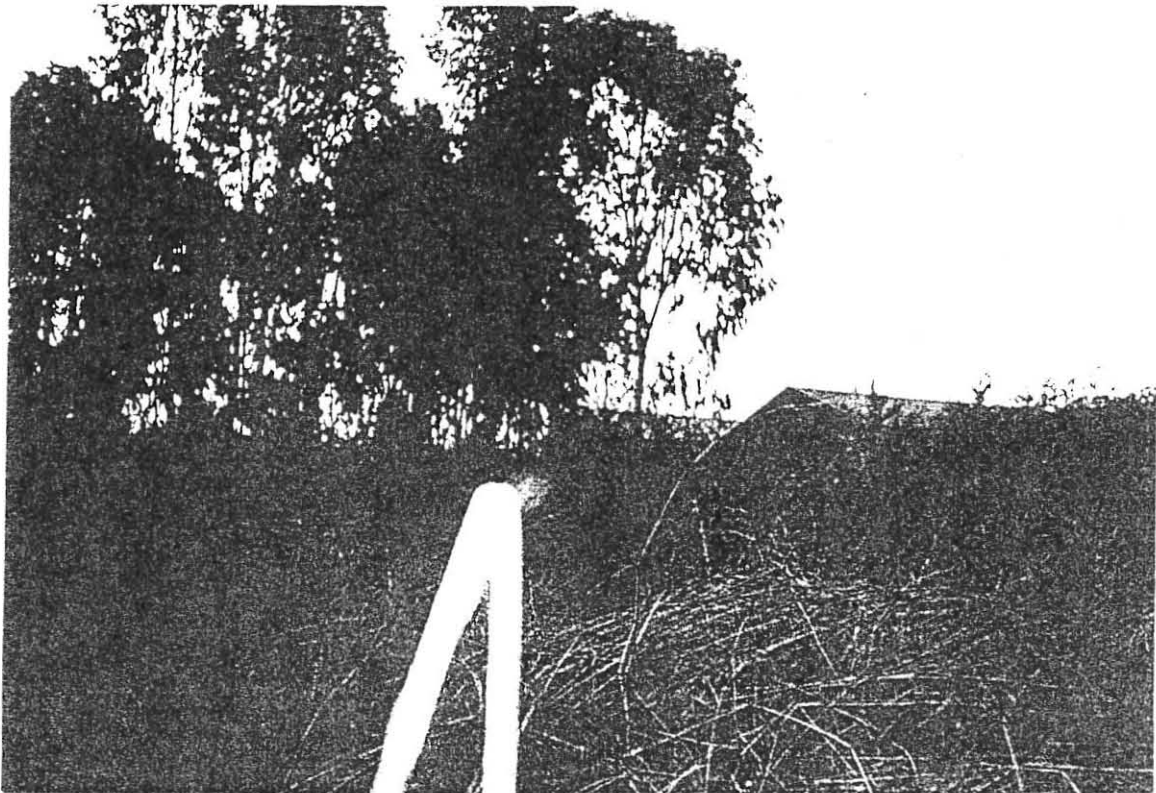
A Village people on
the occasion of winding
their Discussion on the
Local Environmental
Issues at Nafuro.



A Nursery Site In Gidda Ayana S.S.S



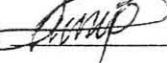
Some Of The Plants in Gidda Ayana S.S.S.



DECLARATION

I, the undersigned, declare that this is my original work, has not been presented for a degree in any other university and that all sources of material used for the thesis have been duly acknowledged.

Name: Desalegn Fuja

Signature: 

Place and Date of Submission: Addis Ababa University, May, 1998