

ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES

THE POSITION OF ENVIRONMENTAL
EDUCATION IN THE SECOND CYCLE PRIMARY
CURRICULUM IN OROMIA REGION

BY ABISHU BIRRU

JUNE 2002

**THE POSITION OF ENVIRONMENTAL EDUCATION IN THE
SECOND CYCLE PRIMARY CURRICULUM IN OROMIA
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DECLARATION

I, the undersigned declare that this thesis is my original work prepared under the guidance of Dr. Derebsa Dufera. All sources of materials used for this study are duly acknowledged.

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List ACRONYMS

<u>EEPA</u>	-	<u>Ethiopian Environmental Protection Authority</u>
<u>FAO</u>	-	<u>Food and Agricultural Organization</u>
<u>IAEA</u>	-	<u>International Atomic Energy Agency</u>
<u>ICDR</u>	-	<u>Institute for Curriculum Development and Research</u>
<u>MOE</u>	-	<u>Ministry of Education</u>
<u>OPEDB</u>	-	<u>Oromia Planning, Economic and Development Bureau</u>
<u>ORCS</u>	-	<u>Oromia Regional Conservation Strategy</u>
<u>TGE</u>	-	<u>Transitional Government of Ethiopia</u>
<u>UNEP</u>	-	<u>United Nations Environmental Program</u>
<u>UNESCO</u>	-	<u>United Nations Education, Scientific and Cultural Organization</u>
<u>UNICEF</u>	-	<u>United Nations International Children's Education Fund</u>
<u>WHO</u>	-	<u>World Health Organization</u>

ABSTRACT

The intent of this study is to investigate the incorporation of environmental issues pertinent to the natural environment in the lower grades (Grades 5 and 6) of the first cycle primary curriculum prepared for Oromia Region. Science and social studies textbooks were used for the analysis because these materials are more relevant to environmental education.

The methodology employed for the study is content analysis. Descriptive survey method is also used to strengthen the data obtained from content analysis. A statistical test was conducted to ascertain the reliability of coding between the two coders used for coding. To attain the intended objectives of the study, five different types of coding sheets were developed by a researcher and used by the coders. Questionnaires and focus group discussions were also employed. Trial run was conducted for all data collecting instruments. In addition to the data through content analysis, 90 teachers and 73 students were used as sources of the data.

The findings of the study show that the textbooks do not satisfactory to incorporate environmental issues. Particularly social studies materials for both grades lack many of environmental elements. Significant numbers of objectives in the syllabuses were not explained in the textbooks. Some of the topics that tend to present environmental education in science

materials are not in the order suggested in the syllabuses and to the interest of the learners. Hence, it is recommended that Oromia Education Bureau and subject experts in the Bureau have to use the findings of this study and conduct a thorough study on the other aspects of environmental education in the curriculum that are not covered in this study.

CHAPTER ONE

1. INTRODUCTION

1.1 Background

One of the crucial problems in this world, particularly in developing countries, is the deterioration of natural resources that aggravates poverty, famine and poor living standards. The range of these environmental problems is very diversified and extends from local to global. Global environmental problems such as treats to the Ozone layer, the exhaustion of petroleum resources and others call for worldwide action and management on international scale. There are also environmental problems that require agreement and joint effort among the affected countries that include the destruction of tropical forests and the extension of regional deserts.

The human impact on land has been enormous, as land-use has changed; natural vegetation is cleared for agricultural use, settlements and urbanisation. Acute concern is now widely expressed over the deforestation of tropical forests, the degradation of grasslands and wetlands, and desertification. Similarly, the human impact on soils has caused considerable damage, which is caused by soil degradation and erosion, poor agricultural practices, excessive water extraction, poor irrigation methods and defoliation. The effects of these problems can be more disastrous to countries like Ethiopia whose economies are heavily dependent on agriculture.

In developing countries, environmental problems are mainly emerged from lack of awareness about the nature and its relation to the sustainability of human life. Intensive exploitation of natural resources and unwise use of these resources characterise the cause for environmental problems in developing countries.

In developed countries, the problems are more complex and the situation requires sophisticated design and action. Most of the problems in these countries arise from the intensive application of science and technology resulting from industrial pollution and high-rate of resource use.

Whether it is in developing or developed countries, environmental problems in one region can affect the other directly or indirectly. What is needed is therefore, to understand the causes and effects of these problems and devise joint efforts for the prevention and finding solutions in the context of the totality of the environment. A dynamic measure that could bring appropriate responses to these problems would be to educate the people of all ages on the environment for making better decisions. In this context, environmental education becomes a corner stone of public awareness about the environment and prevention of environmental problems and finding possible solutions. Moreover, it is true that education must provide the young people with the tools they need to become effective members of their society and provide new information so that they can adapt to changing circumstances.

Environmental education is a fundamental part of the total educational package, especially in primary and secondary schools. It must insist young people on the value and necessity of local, national and international co-operation with a view to solving environmental problems. Therefore, it is of great importance to teach various aspects of environmental control and

conservation in primary and secondary schools to inculcate the fundamentals of environmental information. Nevertheless, as indicated by Sytnik, (1985:6) the presentation of environmental issues in the existing curriculum in a number of countries is based upon traditional methods of teaching.

Environmental education should not be confused with environmental science. Because environmental science is not constrained with any one discipline, it is a comprehensive field, it is not ecology, environmental studies etc. Other disciplines may include environmental science that most of them focus on the environmental problems, which may be purely physician in nature (Cunningham, 1994:305). As explained by Disinger, (1987), Environmental education is an integration of disciplines with no exclusion of strategies and with synthesis of information that can occur more readily than when disciplines are isolated (Disinger in Heimlich, 1992:103).

The significance of teaching about the environment in primary schools can be explained by the virtue that young people can acquire the knowledge needed to make decisions and solve problems of their environment. This could be attempted by integrating environmental elements into the formal school curriculum that students can learn about the environment by relating to their existing realities (Hale, 1993, UNESCO/UNEP, 1976, Robottom, in Hale, 1993).

Environmentalists such as Berkowitz, Hungerford, Robottom and others firmly argue that the integration of environmental education in formal education enable to gain a renewed vigour that would open up wider horizons. The importance of integrating environmental education in formal curriculum was also recognised on the international level when the Intergovernmental Conference on Environmental Education conducted in Tbilisi (Georgia), in 1977.

One of the objectives of the Federal Policy on natural resources and the environment is to raise public awareness and promote understanding of the essential linkages between environment and development (EEPA, 1997: 24). This clearly indicates the need of environmental education both in formal and non-formal education for people of all ages.

The incorporation of environmental elements in formal curriculum and the approach used require assessment so that education can take and tackle its share in solving environmental problems. Consequently, "What" and "How" to incorporate environmental elements in formal curriculum is the most important thing that has to be emphasised.

1.2. Statement of the Problem

Environmental problems become the crucial issues emphasised by various groups, individuals, organisations and governments at the international and

regional levels. Among many of the problems deforestation, land degradation, pollution, disposal of toxic and hazardous waste and the effects of acid rain have been recognised as environmental problems on a world scale.

Environmental education, therefore, has to enable people to solve these problems first by creating positive awareness. With this regard Sytnik, (1985) stated that the task of environmental education is that through education, the individual can acquire the knowledge needed to make decisions and solve problems by allowing him/her to participate as a responsible citizen. The way environmental education has to be taught varies with the aim of education, the learners and the situation in which learning takes place. One way of producing environmental awareness is teaching children in schools.

Although environmental problems are extending severely and the concept of environmental education is very wide, environmental education in Ethiopia has been almost left for few sectors such as the Ministry of Agriculture and Environmental Protection Authority. However, over the past few years, with the emergence of the New Education and Training Policy (1994) some developments have been observed that raised the degree of environmental education in formal curriculum.

The policy envisages that educating citizens about their environment and making them take care of and utilise resources wisely is a necessity (TGE,

1994:7). With this policy framework, since 1995, many subjects that were linear have become to be integrated and presented in primary schools. Today, environmental education becomes one of the major areas of the science and social studies curricula in primary schools.

With the realisation of the decentralisation process that the country follows, the Oromia Regional State Education Bureau has developed teaching materials such as textbooks for primary schools (Grades1-8) in the region. These materials were prepared to attain the general objectives of the Education Policy. Consequently, they have to incorporate environmental elements at different grade levels. The intent of this study is, therefore,

- ◆ to assess the status of environmental education in the second cycle primary school curriculum in Oromia
- ◆ to explore the extent to which environmental education is incorporated in different second cycle primary subjects
- ◆ to identify the approach used to integrate environmental education in school curriculum.
- ◆ to suggest constructive and supportive ideas that help to teach environmental education in primary schools in the region.

Research Questions

In order to attain the intended objectives, the study attempts to answer the following research questions:

1. To what extent are environmental elements integrated in the second cycle primary school curriculum in Oromia?
 - ◆ What are the major environmental elements presented in the textbooks prepared for the lower grades of second cycle primary?
 - ◆ What environmental problems are treated in different subjects of the second cycle primary curriculum?

2. How is environmental education is integrated in the second cycle primary curriculum with regard to:
 - ◆ the contents
 - ◆ the activities suggested and
 - ◆ the evaluation techniques used in the curricular materials

3. What is the current position of environmental education in the second cycle primary school curriculum to solve environmental problems?
 - ◆ Does it address local environmental problems?
 - ◆ Does it help to solve these environmental problems?

1.3. Significance of the study

It is clear that a study at least attempts to contribute to the existing knowledge, or helps to solve existing some problems by suggesting possible

solutions. The findings of this study, therefore, have a significant importance as it is expected that it:

- ◆ provides some features of the curriculum materials in the region concerning the incorporation of environmental elements in the curriculum, and suggests the necessary improvements to be made.
- ◆ reveals to curriculum developers and textbook writers some environmental problems, and suggests what is to be done to integrate environmental education in formal curriculum.
- ◆ insists individuals, groups and institutions to make further investigation on the issues related to environmental education.

1.4. Delimitation of the Study

The elements of environmental education are increasing from time to time due to various reasons. Some of these have global characteristics and some are restricted to regional, and some are even related to geographical locations, population settlements etc. Addressing and treating all these issues at this level is not the aim of this study. However, the major environmental elements related to natural environment and specifically pertaining to our country in general and to the region under the study in particular will be investigated.

The study is also limited to the identification of the major environmental problems in the region and to the demonstration of the ultimate way that education can help to solve the problems. Moreover, the extent of the

incorporation of environmental elements in the indicated curriculum materials is the focus of this study. For the analysis of the incorporation of environmental elements in the formal curriculum, the syllabuses developed by the ICDR were used as a curriculum guide.

Specific subjects were used for the study, namely science and social studies for Grades five and six. These subjects are selected based on the belief that environmental issues are most likely related with science and social studies (Hale and Hardie, 1993:16, Heimlich, 1992:103).

1.5. Limitations of the Study

Textbook evaluation requires careful and critical analysis. Besides content analysis, the data for the study was collected from four zones, eight woredas and twenty-four primary schools in the region. This could be managed only if there is adequate resource enough time. Thus, financial and time constraints were the main limitations of this study. However, efforts have been made to cope with whatever the problems there and attain the objectives of the study.

1.6. Definitions of Some Key Terms

Environment: A whole set of natural organisms

Environmental Education: A process through which persons become aware

of, and concerned with the environment and its related problems, and acquire the knowledge, skills and determination needed to solve those problems (Sytnik, 1985:6).

Environmental Activities: Protection and conservation of natural resources

Environmental problems: includes,

- ◆ Deforestation: Clearing of forests, trees; bushes
- ◆ Environmental degradation: The de-valuing of, and damage to the Environment (Cunningham et. al, 1994:283). It includes Erosion, over cultivation, Overgrazing and Poor agricultural practice
- ◆ Desertification: Causing desert by destroying natural vegetation and brought natural imbalance
- ◆ Killing wildlife
- ◆ Pollution (Water and Air)
- ◆ Overpopulation: Population increase in a way that can affect natural balance of the environment.

Environmental Elements: This includes;

- ◆ Vegetation (trees, bushes, shrubs, forests or all plants)
- ◆ Land
- ◆ Wildlife
- ◆ Water and water resources
- ◆ Air
- ◆ The interaction between man and natural environment

Curriculum materials: Grades five and six science and social studies textbooks prepared for primary schools in Oromia.

Integration: The linking of all types of knowledge and experiences contained within the curriculum plan (Ornestein, 1998)

Lower Grades of Second Cycle Primary School: Grades 5 and 6

CHAPTER TWO

2. REVIEW OF RELATED LITERATURE

2.1. The Concept of Environmental Education

Environmental education is a fast emerging discipline in the world. Merging the ideas and philosophy of environmentalism with the structure of formal education systems, it strives to increase awareness of environmental problems as well as to foster the skills and strategies for solving those problems.

In the early 1900s, three related fields of study arose that eventually merged to form the present day environmental education. These were Nature Education, Conservation Education and Out-door Education. Whatever the name is, environmental endeavours focus on environmental awareness, attitudes, skill development and citizenship participation in environmental problem solving.

The essential principle of environmental education is that, through it, each individual can and should acquire the knowledge and skills which enable him to participate in all decisions needed in problem- solving and to shape in a responsible way in the planning and management of a democratic society. The rise of environmental education, as one of the priority areas of educational innovation, seems to be based on three concepts (UNESCO/UNEP, Series 17:1):

- i) an increasing awareness of the crucial role, which a sound environment would play for the survival and further development of mankind.

- ii) a restructuring of scientific inquiry away from disciplines and towards a total systems approach regarding a given situation
- iii) a trend of modernizing curricula in formal and non formal education to make them more relevant to current problems and to ensure a high degree of active learner participation in dealing with these problems

2.1.1. Definition

Different groups have viewed environmental education from different perspectives, and thus it has been given different definitions. According to Sytnik, et. al. (1985:1) environmental education is a fundamental process through which people' at all educational levels (present and future citizens) become aware of, and concerned with the environment and its related problems, and acquire the knowledge, skills and determination needed to solve those problems.

Hale (1993:132) defines environmental education as “ the means of raising people's awareness towards their environment by developing their knowledge and understanding.” This definition reveals that the responsibility of environmental education is more significant in arising awareness.

UNESCO/UNEP has further clarified the definition of environmental education stating that “it is the process through which man will be capable of acquiring knowledge and experiences, internalise them in behaviours that include attitudes and values leading to a better interaction with the environment” (UNESCO/UNEP, Series; 17:14).

Heimlich (1992:103) has defined environmental education as “ ... a process of moving individuals towards stewardship and ultimately a union view of the relationship of people with nature.”

The above definitions for environmental education entail that environmental education is the process of recognizing the environment and environmental issues and clarifying the fundamental concepts to acquire the knowledge, skill and attitude for the betterment of the environment. It is also the means of determining the connection and interaction between man and his environment. This involves the adoption of decisions and the elaboration of a code of behavior relating to the quality of the environment.

2.1.2. Aims and Objectives of Environmental Education

The Tbilisi Conference (Georgia, 1977) has stated that the ultimate aim of Environmental Education is to enable people to understand the complexities of the environment and the need for nations to adapt their activities and pursue their development in ways, which are harmonious with the environment (UNESCO, 1977:12).

Based on this basic aim, the conference had developed three distinct goals of environmental education. These are,

- ◆ to foster clear awareness of, and concern about economic, social, political and ecological interdependence in urban and rural areas
- ◆ to provide every person with opportunities to acquire the knowledge, values, attitudes, commitment and skills needed to protect and improve the environment.
- ◆ to create new patterns of behavior of individuals, groups and society as a whole towards the environment

The conference has also outlined categories of environmental education objectives (Recommendation No. 2) as follows (UNESCO, 1977:26-27):

Awareness: to help social groups and individuals acquire an awareness of, and sensitivity to the total environment and related problems

Knowledge: to help social groups and individuals gain a variety of experience in, and acquire a basic understanding of the environment and its associate problems.

Attitudes: to help social groups and individuals acquire a set of values and feelings of a concern for the environment, and the motivation for actively participating in environmental improvement and protection

Skills: to help social groups and individuals acquire the skills for identifying and solving environmental problems

Participation: to provide social groups and individuals with an opportunity to be actively involved at all levels in working toward resolution of environmental problems.

The above stated aims, goals and objectives of environmental education reveal the emphasis given to knowledge, skill, attitude and the practical involvement of individuals in the environmental activities at all levels.

The conference has also developed and provided the guiding principles that help to achieve the goals and objectives stated for environmental education. These guiding principles demonstrate features of environmental education such as totality, lifelong process, its dimensions and historical perspectives (See also Appendix-VII).

As to Ramsey and Hungerford, (1989, Cited in Trisler, 1993:89) a primary goal of environmental education is the development of responsible environmental behavior in citizens, both as individuals and as societal groups.

UNESCO (1989:64) has also stated that environmental education should aim at fostering environmental literacy among all citizens who should make sound judgments and decisions and ethical responsibilities about the environment and its related issues. This clearly indicates the need for individual, group or institutional responsibilities for sustainable environmental development.

Generally, the main aim of environmental education is to raise people's awareness of the environment by developing the knowledge and understanding the process by which it is shaped. It also aims at involving people in environmental issues and value judgments that need to be made at a personal level.

2.1.3. Aspects of Environmental Education

It is clear that the human-environment relationship is universal. It develops through the interaction of humans and their environment and human

adaptation to the environmental circumstances of each place and time. As indicated by Hale, (1993:Xi) while in one sense, environmental education is universal, in another sense, it is culturally related to the place of its origin.

The home, the community and the school are the three basic spheres of environmental education. Efforts in all these spheres must be linked to create appropriate perceptions of environmental problems, as well as solutions based on environmental awareness. Environmental education starts in child's home and immediate neighborhood. A child's perception of the environment develops both at home and through formal schooling in nursery schools, temples, churches and other primary institutions.

Kumar (1977:2) states that one of the most important components of the environment is ecology and thus, environmental education has to inculcate to promote ecological awareness that is interrelated with the protection and conservation of natural resources.

Brown (1973:2) has stressed the significance of protecting and conserving natural resources. Conservation of water, soil, vegetation and plants, wildlife and all other species is the most important aspect of the environmental conservation because the subsistence of humanity is directly or indirectly depends on these resources. He further explains that conservation of these resources is inextricably tied together and cannot be separated. Moreover, he stresses the diversified importance of conservation of vegetation that involves

the control of burning, cultivation on steep slopes, the grazing areas of livestock and forest destruction

UNESCO/UNEP (1988:8) has pointed out that environmental education has focused mainly on problems related to conservation of resources, preservation of plants and animal life, and similar themes that foster for sustainable life of human beings. It also includes the teaching of determining certain values and the ability to clearly think of complicated environmental problems that are social, economic, political and philosophical.

As cited in UNEP/UNICEF (1990:59), environmental education has to include a study of soil, plants, animals, water, air and their interaction with the human environment, as well as considerations of basic human needs, sustainable development etc. These natural components of environmental education and protection, and conservation of natural resources are adopted in the analysis of the study.

2.1.4. The Significance of Environmental Education in Schools

The Problem

Environmental problems are numerous and too many to be treated. According to the UNESCO/UNEP (1989:58) report, the major pressing environmental problems in our world include the clearing of forests, loss of productivity of land, present and future climate changes due to carbon-dioxide build up in the atmosphere, mismanagement and misuse of resources, pollution, chemical hazards, inadequate energy resources, erosion, floods and famine.

Hale (1993:25) has also pointed out deforestation, pollution, desertification, land degradation, disposal of toxic and hazardous waste and the effects of acid rain are the most crucial problems in today's world. Moreover, since 1980's, the world has seen the emergence of additional environmental challenges such as global warming and the depletion of the ozone layer.

It is true that, natural resources have been intensively exploited for centuries, without regard for the social consequences of economic activities. This has resulted in the destruction of forests, trees, soil erosion, air and water pollution, and damage of various species and changes in the biosphere that adversely affect human life. In many parts of the world, there has been a sharp increase in desert and semi-desert areas, with a corresponding reduction of forest areas and arable lands. Large number of animals and plant species has been exterminated. In some countries of the world, deposits of many minerals have been totally depleted (Sytnik et.al. 1985:5)

The Need to Introduce Environmental Education

Examination of the above problems reveals that environmental problems are social, economical and even political problems that badly affect individuals, groups, countries and the entire world. These problems can only be addressed by the identification, development and promotion of methods of environmental utilization and the interaction that are responsible, sustainable and careful. If we compare the present situation with that of the ten or twenty years ago, we notice a trend towards gradual comprehension of

the problems and the recognition of the full importance of environmental education.

While learning about the environment, children are exposed to a wide variety of living and non-living components of their everyday lives. It is very important, therefore, to give the opportunity to discuss the value of the components they have observed and how these affect each other in the environment (UNESCO, 1977, Sintayehu, 1996).

The education provided in schools should make an effective contribution to solve environmental problems. Pupils in primary schools have a significant role to play in promoting the basic concepts of sustainable development in their communities. The kind of environmental education to be given to pupils must be relevant to the societal needs of the community. One of the methods adopted to resolve environmental problems and to develop environmental awareness among the population has been to mobilize children in primary schools as agents of change.

It is also very important to take into account various aspects of environmental control in primary and secondary education to teach the fundamentals of environmental information on the situation of the modern world and the possibilities of its transformation. Nevertheless, as pointed by Hale (1993:6), the presentation of this new subject in the existing curriculum of a number of countries is based upon traditional methods of teaching, regardless of the international nature of the concerned problems.

Sytnik (1985) has also explained the importance of providing environmental education in schools that young people can acquire the knowledge needed to make decisions and solve problems of their respective environment. With this regard, the Tbilisi conference has also recommended (Recommendation No.15) possible ways of overcoming local and global environmental problems. One of the recommended ways is that the students in primary and secondary schools should be provided with a general knowledge of the environment and its problems (UNESCO, 1977:34).

2.2. The Development of Environmental Education (Overview)

Long before the term "Environmental Education" came into common usage in the seventies, certain elements of environmental education concept existed in school curricula under various names; such as, Nature study, Rural science, Conservation Education, Field studies, Geography, Biology etc (UNESCO/UNEP, Series 17:7-8).

The concern for environmental education, as a distinct entity, became evident in the early seventies, and therefore the seventies may be referred to as the decade of Environmental Education. During this period, several countries started making their own efforts to incorporate elements of environment to their education systems. In addition to these institutional efforts, individual actions at national level were made to strengthen these

activities under the auspices of the United Nations (UNESCO, 1985, Peckering and Owen, 1994:3).

One important out-come of the efforts at different times was the first United Nations Conference on the Human Environment, Stockholm, June 1972, organized by UN which highlighted the need to develop an environmental education program at the international level. As a result of this conference, the United Nations Environmental Program (UNEP) was established in the same year.

In 1975, an International Workshop on Environmental Education was conducted in Belgrade by UNESCO/UNEP that provided the framework for global environmental education known as "the Belgrade Charter." This charter recognized the urgent need in environmental education to develop a global understandings or perspectives of the environmental considerations. The Belgrade conference, then paved way for the Inter-governmental Conference on Environmental Education held in Tbilisi, 1977.

The goals and guiding principles outlined, and the declarations and the recommendations forwarded by the Tbilisi conference considered as the most important single document on environmental education (UNESCO, 1978, Prabhakar, 1981, Browne, 1983, Hale, 1993).

The approach of the 1980s was launched to manifest the world conservation strategy. For example, the 1985 Cairo Program for African Co-operation of the African Ministerial Conference on the environment, and the recommendations made by the World Commission on Environment and Development in 1987, were to restore people to a central place when environmental needs are considered.

Similarly, the International action on global atmospheric pollution has resulted in attempts to reduce Ozone depletion (known as the Montreal Protocol, 1987). The reduction in greenhouse gas emissions (UN framework convention on climate change, 1992) and the convention on climate change (The Kyoto Protocol, 1997), have all geared nations towards the international concern for global atmospheric pollution.

The Emergence of Environmental Groups

In recent years, the development of another phase of environmental movement has been seen which is characterized by the concern evinced and the organization-taking place on a national and international scale, around some important and widespread problems.

Environmental groups and Non-Governmental Organizations (NGO) have played a major role in the development of environmental education and the emergence of environmental movements. There are many examples of

environmental groups and NGOs in many countries of the world that moved for the better environment of our earth and its atmosphere.

The great movements of these environmental groups make them enjoy great public credibility, for example, groups objecting the construction of nuclear facilities in their countries or neighborhood in USA, the UK, Germany, Austria, Sweden and other countries have a decisive role to restore their environment. In India, the Chipko Movement, the Delhi Science Forum, the Medico Friend Circle, and the Lawyer's Collective have played a significant role in promoting environmental awareness (UNESCO/UNEP, 1988:7).

The Green Belt Movement which was set up by the National Council of Women of Kenya in 1977, identified forest losses as among the most serious causes of soil erosion and land degradation in the country. There were similar movements in a number of countries, such as Mexico, Sri-Lanka, Indonesia and the Philippines, all supported by people struggling for the sustainability of their livelihoods and their environment (UNESCO/UNEP, 1988:8).

NGOs that campaign on many environmental issues, as well as single-issue groups are also influential in many countries of the world. Among the better known are the Natural Resources Defense Council and Environmental Defense Fund in the USA, Sahabat Alam in Malaysia, Grupo de los Cien in

Mexico, Bund in Germany, Italia Nostra, and the Danish Nature Protection Society.

There is similar co-operation across international boundaries to deal with regional or global issues. This may be said to have began in 1988 with the foundation of the International Union for the Protection of Nature (later called the International Union for Conservation of Nature and Natural Resources (IUCN), which is unique in having a membership comprising over 60 Governments, 130 government agencies and 350 national and international NGOs. Several NGOs, such as Friends of the Earth, Green Peace, and World Wide Fund for Nature (WWF) comprise many national affiliates. The Nuclear Free Pacific Movement has been an umbrella under which many groups have met and taken steps to halt nuclear activities in the pacific.

Recently established African NGOs in environmental protection and conservation of natural resources in the wake of the first session of the African Ministerial conference on the Environment, held in Cairo in December 1985.

There are also, limited NGOs in Ethiopia that are tend to act on environmental issues. For example, Lem Ethiopia, Environmental Protection and Assistance Organization, and Ethiopian Environmental NGO are some of the local NGOs that take some initiatives for the betterment of our

environment. There are also many bilateral and multilateral NGOs, which incorporate environmental education into their overall development programs.

In parallel with - and linked to - the great expansion of the NGO movement since the 1960s, there has been a marked increase in the number of governmental institutions established to deal with environmental issues. Today, nearly all countries have environmental machinery of some kind.

Intergovernmental organizations like the Organization for Economic Co-operation and Development (OECD), the Council for Mutual Economic Assistance (CMEA), the European Community, the Association of South East Asian Nations (ASEAN), the Gulf Co-operation Council, the Arab League, and others have established special offices or units to tackle environmental issues.

At the international level, different United Nations bodies have undertaken several activities, especially since the 1970s. The Global Atmospheric Research Program, The World Climate Program, The UNESCO Man and the Biosphere Program and several projects by FAO, WHO, IAEA, and other United Nations bodies are examples of these activities. Moreover, the establishment of UNEP in 1972 marked the significant commitment of the world community to the environmental cause (UNESCO/UNEP, 1988:9).

2.3. Trends of Environmental Education in Some Countries

Long before the emergence of environmental education became a global concern, different countries have designed environmental education to cope with the problems of their environment. However, the effectiveness of their program varies with the countries' stage of development and the way they understood and handled the problem. With this regard, one of the problems was that countries had no common understandings about the global features of environmental problems and the significance of environmental education, especially in formal school curriculum.

To bring global environmental awareness and develop global strategies, various symposiums, workshops and conferences were organized by United Nations and other international and regional organizations. For example, the symposium on Environmental Education, Switzerland (1966), the conference on Conserving Recoverable Natural Resources, Argentina (1968), Environmental Protection Conference, Switzerland (1971), the conference on Environmental Education at the University Level, France (1971) and many others were conducted to bring some common understandings on environmental education.

These international efforts on environmental issues played significant role to wake up some countries to identify their environmental problems and plan to act in all their developmental sectors. The following paragraphs

demonstrate the efforts taken by some countries of the world to tackle environmental problems by introducing environmental education in schools.

Germany

One of the bases for environmental education in Germany was that the resolution made by the conference made in 1980 in the country. The focus of the agreement of the conference was on the recognition that man's relationship to his environment has become a question of survival. Thus, interests become to raise awareness both through formal and non-formal education (UNESCO/UNEP, 1983:8).

Aspects of environmental education have become recognized as components of curricula in a number of subjects. In primary schools, environmental education is taught as part of the subject. For example, in the first grade "rain water" is dealt with as the first environmental topic in the subject nature. In higher grades (Grades 11 to 13), environmental education is taught as part of subjects like geography, biology, physics and chemistry.

With regard to the approach, the project method is often applied in teaching environmental education. This helps to facilitate the combination of theoretical considerations and practical experience, an aspect that is important for environmental education (UNESCO/UNEP, 1983: 22).

Overall observation of environmental education in Germany shows that it receives wide coverage on all levels of the education system through a variety

of subjects. The student is expected to understand that he/she has to take part in the responsibility for environmental policy and that this policy determines part of the orientation marks of the human life.

Malaysia

In Malaysia, environmental education is recognized both in formal and non-formal education. In formal education, it can be explained by that the curriculum developers and science educators have been showing a concern for environmental problems resulting in the introduction of environmental concepts into the school curriculum.

In the Malaysian school curriculum, environmental education is not treated as a separate subject, but environmental education concepts are infused into already existing subjects. For example in the primary and lower secondary level, the integrated science subject incorporates the practical application and the use of environmental resource elements. Similarly, in the upper secondary stage, a General science syllabus subscribes a similar kind of integration. It stresses the understanding of basic scientific concepts in relation to the pupils' environment and the application to everyday situations (Prabhakar, 1981:106, UNESCO/UNEP 1989).

India

India has established environmental education policy that is the base for the development of environmental education in both formal and non-formal programs. In the formal program, the elements of environmental education incorporated in the school curriculum falling into three categories (Atreya, 1981:62).

- ◆ education for the environment,
- ◆ education about the environment and,
- ◆ education through the environment.

This shows that the recognition of environmental education in formal education in India has been made prevalent and become the bases for education.

At the primary level, environmental studies have been identified as an important area of study for the accomplishment of many of the objectives related to the natural and social environment. Concepts relevant to environmental education are found in some topics around which this curriculum is developed.

In upper grades, environmental education is taught as a separate subject. It encompasses social sciences such as geography, history and natural sciences such as physical environment, biology and health science (Atreya, 1981:63).

Colombia

In Colombia, environmental education is recognized with the establishment of environmental policy that includes an ecological code and a series of educational reform decrees made by Ministry of Education. The Ministry of Education has undertaken an educational reform, which has meant

incorporating environmental education principles that have agreement at international conferences.

Environmental education is incorporated in Colombian school curricula by integrating environmental themes in to various subjects. The integration of environmental issues into the content and activities in the curriculum has based on the understanding of the immediate natural and social realities. For example, the following contents are presented in different subjects in primary schools: Natural resources and their rational use; Comparison of rural and urban environment; Changes on the earth; Ecological dialogue; Development and maintenance of non-renewable resources, etc. These contents are reflected more in natural sciences and social sciences to which these subjects are more related and have to present issues of the environment (UNESCO/UNEP, Series 17: 11-26,29).

Jamaica

In Jamaica, environmental issues have special attention, as the country is an island. The Government of Jamaica has designed and tried to make practical the national policy on the Environment and Environmental Education. Most of the environmental education programs are of a non-formal nature that is carried out by government agencies most directly concerned with environmental matters. Nevertheless, the Ministry of Education is concerned with the introduction of environmental education into the school curriculum.

Topics that best tend themselves to the development of environmental education were identified and incorporated in different subjects of school curricula. For example, in grade seven and eight General science, topics like, science and us, our place in the universe and weather and everyday life are taught (Browne, 1983:10).

With the development of the recognition for environmental education the Government of Jamaica established the National Environmental Education Committee in 1993. The committee is responsible for the promotion of environmental education both through formal and non-formal programs (Internet, <http://WWW.Nrca.org/necweb/eesd/eeinjamaica.htm>).

Venezuela

Traditionally, Environmental Education in Venezuela is associated with the teaching of conservation. With the beginning of industrial development and the population concentration in cities, environmental problems became severe and a revision of the concept and strategies of environmental education was required.

With the establishment of the Ministry of Environment and Natural Renewable Resource in 1977, the Department of Environmental Education was formulated. The department was responsible to change the

environmental behavior of the Venezuelan by introducing environmental elements into the education system and dissemination action.

As a survey made by UNESCO/UNEP indicates, in Venezuela environmental education is viewed as an integral education. Thus, it is not presented as a separate discipline but as the result of the orientation and articulation of the various disciplines. Activities and contents related to the environment are incorporated in different subjects of the school curriculum. The Department of Environmental Education specifies the contents of environmental education for primary schools.

For the evaluation of the environmental education content, the normal evaluation procedures adopted for the basic education level are used. Each learning situation is evaluated using diagnostic, formative and summative tests. (UNESCO/UNEP, Series 17:112).

Kuwait

Since the Inter-governmental Environmental Education Conference in Tbilisi, there has been a particularly strong movement in the Arab Gulf states. Initiatives took place to introduce environmental education into the school curriculum.

In Kuwait, environmental education at the school level is presented primarily as an integral part of the science courses. The environmental education

curriculum in Kuwait forms a part of the revised science curriculum. The environmental education content is infused mainly into the school biology syllabus, particularly through units dealing with pollution, natural resources, food problems, environmental balance and desertification. The contents of environmental education at the primary level include elements of the environment, adaptation to the desert environment, composition of the earth, effects of air pollution, exploitation of solar energy and others (UNESCO/UNEP, Series 17:74-76).

Uganda

Before the 1970s, environmental and health education were taught in Ugandan schools as nature study and hygiene. Nevertheless, today, environmental education is integrated into the science curriculum, which is one of the core subjects at the primary level. In 1987, when a major review of the primary school science syllabus was undertaken, environmental and health education has become a major elements of primary school curricula.

The science courses at primary level aims to help young people understand environmental problems, and also give them the opportunity to acquire knowledge and skills that will encourage them to become involved in environmental control, protection and development. This is because; one of the ways to resolve environmental problems and to develop environmental awareness to the population has been to use school children as agents of change. Thus, the primary school system in Uganda is recognized as one of the most effective means of conveying messages of environmental awareness (Acar, 1993:23-26).

Kenya

Environmental education existed both in primary and in secondary schools of Kenya long before the international outers for environmental education to safeguard against the worldwide environmental crises. Environmental education has been presented in various subject disciplines such as science, geography and agriculture.

Courses are not offered as environmental education as such, but as an integral part of subjects such as Geography, General science, Biological science and the African social studies program. For example, pollution is taught in relation to hygiene in General science, and the significance of forests to rainfall is one of the topics that formed part of the Geography syllabus. At all levels of Kenyan schools, environmental education is presented by integrating environmental topics in school subjects.

In the lower primary level (Grades I-III) pupils are presented with a variety of learning experiences to preserve, strengthen and develop further, several of the attitudes and skills and solve problems in a rational and effective way (UNESCO/UNEP, Series 17:67-70).

Experiences of the above-explained countries reveal that environmental education is presented in schools being incorporated into related topics or themes in different subjects. This fosters the presentation of environmental education, and enables to demonstrate the holistic nature of environmental

education. Moreover, therefore the linking of environmental education with other disciplines is evident.

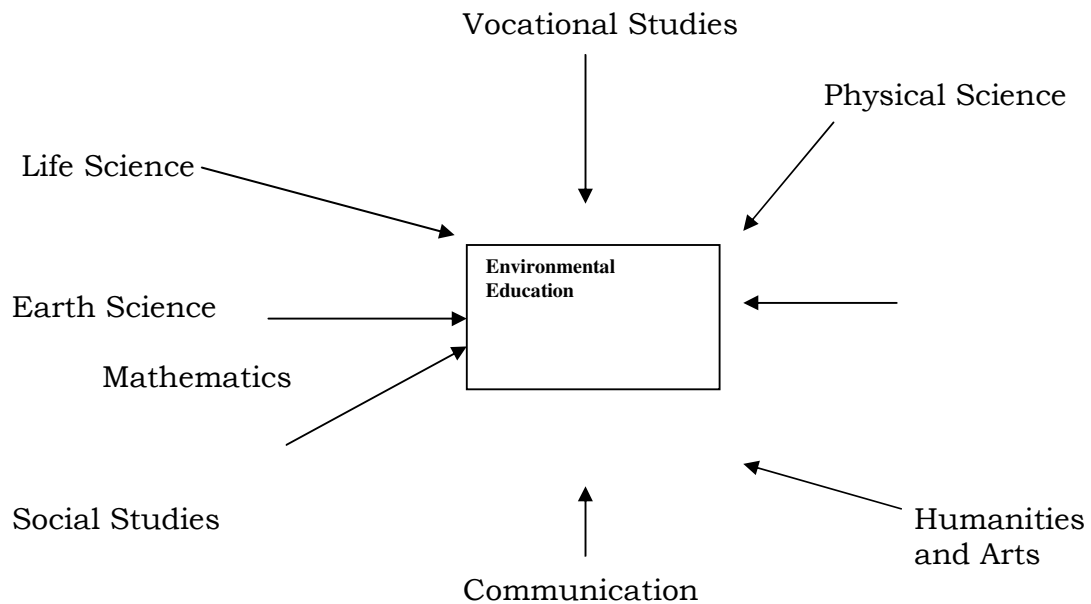
2.4. Approaches to Teach Environmental Education

Environmental education should be thought as a process that takes place for the environment and in the environment. This is to mean that the objectives of all education and environmental education in particular are to enable the individual to fulfill his potentialities and aspirations while acquiring a sense of responsibility and commitment with regard to the improvement of environmental quality for the benefit of all humanity.

As indicated above, almost all the countries have tried to introduce environmental education into their school curriculum. This reveals that the significance of teaching environmental education in formal school curriculum is recognized by most of the countries. The approach they used is almost the same, infusing environmental issues into different subjects. This is, clearly, inline with the multidisciplinary approach, which was recommended by the Inter – regional training conducted by UNESCO in New Delhi in 1989.

According to UNESCO/UNEP, (1989:154) environmental education can be presented in schools through two approaches: the interdisciplinary approach

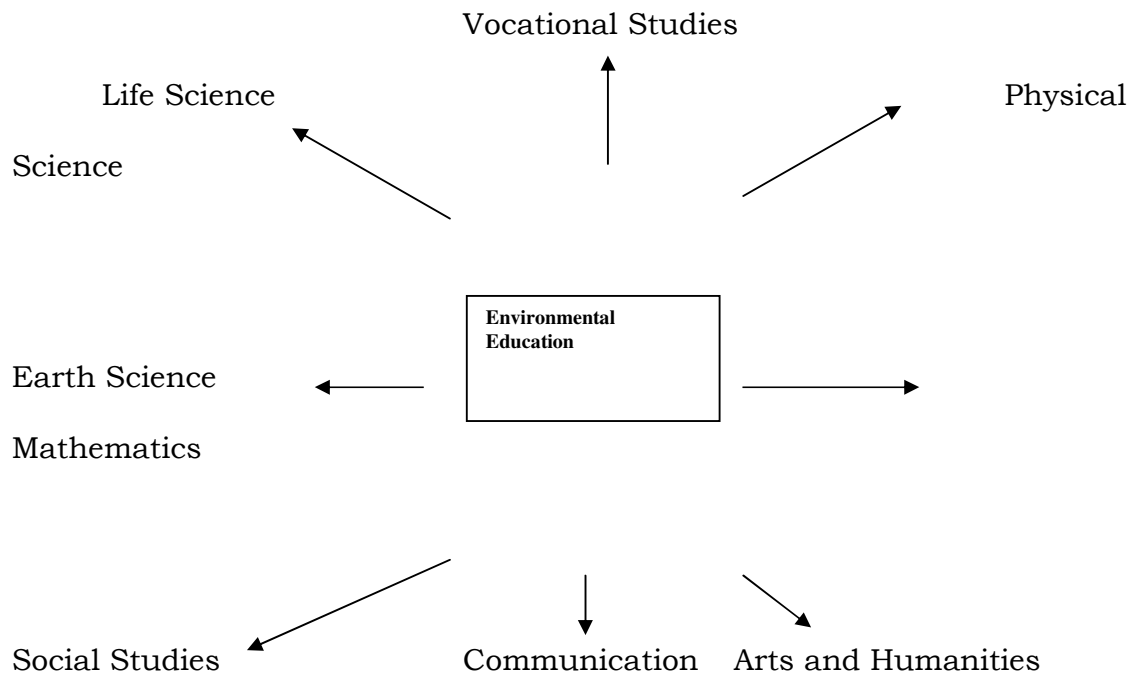
and the multidisciplinary (infusion) approach. In the interdisciplinary approach, relevant components of many disciplines are drawn upon to create a distinct environmental education unit. This ultimately shows that environmental education is considered as one of the major subjects thought in schools. The conceptual model of the interdisciplinary approach for environmental education is as shown below:



Source: Report of Inter Regional Training Course on Educational Planners

And Administrations, New Delhi, (UNESCO; 1989:154)

The multidisciplinary approach is the one that invites the infusion of environmental components into other established disciplines where appropriate. Related topics or themes of environmental education are infused into different subjects so that they are taught to create appropriate relationship with other disciplinary components. This is illustrated below.



Source: Report of Inter-Regional Training Course on Educational Planners

and Administrations, New Delhi, (UNESCO; 1989:154)

The Regional Meeting of Experts on Environmental Education in Africa held in Brazzaville, Congo, in 1976 described that the nature of environmental education is by nature a plural-disciplinary. It is concerned about environmental problems and seeks overall solutions that take account of social and individual values, local constraints while making use of the available technology and resources (UNESCO/UNEP, 1976:24).

This shows the pluralistic nature of environmental education and the requirement for the different

methods to solve environmental problems and its multi- dimensional aspects appeared in different subjects. Thus, environmental education has to be the result of the reorientation and dovetailing of different disciplines and educational experiences that facilitate an integrated perception of the problems of the environment, enabling more rational action and meeting social needs.

UNESCO/UNEP conducted a comparative survey on the incorporation of environmental education into school curriculum in some countries of the world. The findings of the survey show that the common features of environmental education in the countries studied are (UNESCO/UNEP, Series 17:124):

- ◆ environmental education concepts are integrated into the entire system of education at all levels ----- from primary school to the secondary school level.
- ◆ a holistic perspective ----- of the problem is adopted.

Moreover, a significant observation of all countries reveals that they have adopted the strategy of infusing subject matter relative to the environment into different disciplines. This has resulted in the emergence of a multidisciplinary approach. The study shows that almost all the countries under the study have adopted this approach mainly to science and social studies.

As indicated in another UNESCO document, the strategy of infusing environmental concepts into the existing subjects and using them as carriers of environmental education is in effect a combination of the interdisciplinary and multidisciplinary approaches. In this strategy, the content, which is presented through any given subject, would not be confined strictly to the subject in the conventional sense, but would encompass contents that could be identified with one or more subjects (UNESCO/UNEP, Series 17:130-131, Axen et al. 1995).

The Inter-governmental conference on Environmental Education held in Tbilisi also recommended (Recommendation No.12) that (UNESCO, 1978: 32-33):

- ◆ Efforts are required for the incorporation of environmental issues in the various disciplines and subjects of the formal education system.
- ◆ The study of the problem linked with single subject, multidisciplinary, and interdisciplinary approaches.

Heimlich, (1992:103) describes three distinct approaches for the incorporation of environmental education in formal curriculum: Imposition, Infusion and Framing. Imposition refers to the addition of additional topics into the required study. Infusion involves the incorporation of environmental themes or topics into traditional disciplinary approaches. Framing is the using of traditional disciplinary skills to define aspects of real world problems and solving these problems. The challenge here is, as Heimlich

indicated, how to permeate learning experiences with environmental education.

According to Heimlich, among the above-mentioned approaches, the infusion approach attempts to integrate or infuse environmental issues into the school subjects because it streamlines the knowledge, skills, attitudes, experiences and commitment that will result in informed decisions, responsible behavior and constructive action (Heimlich, 1992:105). Similarly, Disigner and Howe (1992) (Cited in Heimlich, 1993:105) say that infusion often “flounders on the reticence of discipline- oriented curriculum designers and teachers” to rely on content from other than their own area of expertise.

Trisler (1993:89) has also stressed the significance of infusing environmental issues into the existing courses that contents and skills are integrated so as to focus on that content without losing the integrity of the courses themselves. He further explains that infusion is more appropriate in primary and middle school levels than in high schools levels at which classes are departmentalized.

Another important aspect of the approach to environmental education is its flexibility to meet the existing environment. This encourages teachers and pupils towards the environment and environmental education. The dependence of teaching environmental education on the immediate

environment of the learner is, therefore, one of the considerations to be taken into account in teaching environmental education.

Contents and Methods

As reported by the Regional Meeting of Experts on Environmental Education in Africa, at primary school level, the pupil must learn to structure and relate the various components of his/her environment. This indicates that the contents of environmental education have to spring out from the environment of the learner that encompasses the different aspects of the environment (UNESCO, 1976:14).

One of the aspects of curriculum integration is that the curriculum has to serve the learner by relating the learning with his/her immediate environment. With this regard, Leu (1997:7) has explained that, an integrated curriculum uses the world of young learner, rather than the academic disciplines, as the starting point for selecting and organizing knowledge. The curriculum should use familiar topics to help young learners first explore their own world. Such learning is meaningful as it is connected to what children know.

As stated by Dchiro, 1987 (Cited in Hale, 1993:3), the environment is what surrounds us, materially and socially. It is not something that has a reality outside or separate from social milieus and us. Rather it should be understood as conceptual interactions between our physical surroundings and the social, political and economic forces that organize us in the context of these surroundings. Thus, the contents of environmental education have to address these interactions and preferably focused on the identification

and solutions for problems, which envisage the selection of contents for the environmental problems or related issues.

The curricula and educational methods for environmental education must correspond to the short and long - term economic, social and cultural development objectives of the country. Teaching methods, in particular, must be designed to ensure the participation of the students and the teacher, the teacher acting more as a coordinator and facilitator.

The methods of teaching environmental education were set forth in the recommendations made by the Tbilisi conference. It is stated that considered (UNESCO, 1977:25); 'the problem - solving approach' and 'activity-oriented approach' are more suitable to teach environmental education

UNESCO (1989:67) has identified teaching methods to be used in teaching environmental education: demonstrations, discussions, field trips, project, simulations, case studies, exercises and laboratory work. The significant importance of using the environment as a living laboratory in teaching environmental education is highly emphasized.

The flexibility and variety of teaching methods depend to a great extent on how the teacher motivates students with the very idea of environmental protection, conservation and considering it as one of the lifelong education.

It also depends on the contingent of students, their age and form of instruction, and on the professional skills of the teacher.

Evaluation

As in the case of every other educational system, environmental education should be evaluated, using both conventional and new evaluation techniques. Traditional evaluation methods are also of great importance. In general evaluation should be (UNESCO 1976:18):

1. continuous and formative
2. critical
3. scientific
4. the result of continuous self - evaluation

Evaluation in the context of environmental education is the process of finding out of objectives that to be fulfilled in the teaching - learning process.

2.5. Overview of Environmental Education in Ethiopia

Ethiopia ranks as one of the poorest countries in the world. According to the 1997 study on the economic status of the country, approximately 27 million people fall below the poverty line. Some 13 million rural people who are mainly subsistence farmers with very small farms or no farms at all constitute the major group of poor people (EEPA, 1997:6).

One of the outcomes of poverty is the deterioration of natural resources, which on the other side aggravates the poverty itself and makes the problem viscous circle. As indicated in the document for the conservation strategy of EEPA (1997), climax forests in Ethiopia, which might have covered some 40 percent of the country, were reduced to about 2.7 percent by 1989, and is still being destroyed at an alarming rate.

Daniel Gemechu (1990:164) has also stressed the endemic nature of mass poverty in Ethiopia, indicating the close relationship between the alarming rate of environmental degradation and natural resource depletion where people are forced to over - exploit their environment because they are too poor to protect their resources.

Similarly, Brown (1973:45) has explained that the difficulty in Ethiopia, which applies particularly to the conservation of forest and wildlife, is the wasteful and inefficient systems of land use. He has strongly argued that, if Ethiopia wants to conserve its national assets of wildlife and other natural resources, either for the interest of Ethiopians themselves, or for the more mercenary reasons of obtaining foreign exchange through tourist development, the pace of the progress for conservation of natural resources must be accelerated greatly.

To overcome the environmental problems, the country has made many efforts in both protection and conservation. Different government institutions

have been established to run systematic programs to handle and tackle the problem. Non-governmental organizations have also introduced environmental issues into their strategic plan and programs. Among many of the efforts made by the government of Ethiopia to promote environmental education through formal and non-formal programs is one of the directions that have to bring sustainable positive effect among the people.

In 1985, with the assistance of SIDA, the Environmental Education Project was launched in the then Wollo province and later expanded to include pilot centers in other four regions. This was after the severe drought of 1984. The project was initiated from the urgent need to raise the people's awareness and understanding of the country's repeated drought and famine situation (MOE, 1992:4).

The objectives of the project were:

- ◆ To raise the capacity of the education system through training and dissemination of technical information
- ◆ To promote a widespread pattern of community based actions in the formal and non-formal education systems.
- ◆ To ensure the relevance of education in resolving the problems faced by the rural population of the highlands, by promoting greater understanding of the environmental conditions through the education system in rural areas.

The strategies designed for the project were training and orientation of education staff, preparing instructional materials, media utilization and practical action. In the formal education program, particularly in the primary school curriculum, an attempt has been made to offer environmental education in four selected subject - areas, namely, Agriculture, Biology, Geography and Home Economics. These subjects have been selected because they contain more environmental elements than other subjects (MOE, 1992:12).

Currently education in Ethiopia is undergoing a number of radical changes. These changes should be exploited to promote environmental education at all levels, which is actually indicated in the education policy. The Education and Training Policy of Ethiopia recognized the importance being given to environmental education and out-of-classroom experience, along with the emphasis on problem - solving skill to acquire in the curriculum by stating (TGE, 1994:7):

- ◆ primary education should lead to the acquisition of knowledge of the natural environment and its utilization and conservation of physical and biological environment

Today, environmental education is integrated into science and other subjects. Since 1995/96, many subjects, which were linear, have been integrated and presented in the primary school curricula. Environmental education, health education, population education and sex education become the major components of the primary school curricula.

Currently the following contents are recommended by MOE to be taught at different levels (Axen: 1995:13)

- ◆ Concepts of environment
- ◆ Relationship between components of the environment
- ◆ Wildlife and livestock utilization

- ◆ Consequences and efforts to combat desertification
- ◆ The need for family planning
- ◆ Problems of poverty
- ◆ Relationship between development, environment and quality of life

The currently available primary school syllabuses recommend a wide variety of teaching methods. These emphasize the practical investigative and problem-solving activities based on children's immediate environment rather than the accumulation of scientific knowledge.

The significance of environmental education was more recognized in our country when the Environmental Authority formulated the policy and implementation strategy. Both the policy and the strategy demonstrate the importance of the incorporation of environmental issues into the formal curriculum at all levels. The strategy recommends that, except for the tertiary level, the teaching of environmental education on a multidisciplinary basis and to be integrated into the ongoing curricula of schools, not to be treated as a separate or additional subject (EEPA, 1997:55).

According to the conservation strategy of Ethiopia (1997:24) the objective of Environmental Education is to provide education, training and awareness programs to increase public awareness and understanding of the need for the sustainable use and management of the natural and human made resources and the environment. For example, one of the objectives stated is

that to promote the teaching of environmental education on a multi-disciplinary basis, and to integrate it into the ongoing curricula of schools and colleges and not treat it as a separate or additional subject (EEPA, 1997:55).

The guiding principles as well as the strategy to promote environmental education in Ethiopia demonstrate the significance of integrating environmental education in formal curriculum on a multidisciplinary basis. Thus, reviewing the integration of these environmental issues in the currently used curriculum materials is reasonable and timely.

2.6. Background of the Region

According to the present regionalization of the Federal Government of Ethiopia, Oromia Regional State covers a total area of more than 370,000 square kilometers, which shares the biggest (33%) of the country's area (Haile-Yesus, 1996:1, OPEDB, 1997:27, ORCS, 2000:2).

The region also stands first in its population size as compared to other regions, constituting nearly 37% of the total population of the country. According to the report of the regional Planning and Economic Development

Bureau (OPEDB, 1997:28), the population growth in the region is rated at more than 3.29 percent per annum. This high rate of population growth brings pressure for intensive use of land and other natural resources.

The region is well endowed with natural resources. This is especially true with the highlands where diversified topographic features, favorable climatic conditions, relatively fertile and deep soil, abundant water, energy and mineral resources, and varieties of flora and fauna species are found. However, the ways of using these resources are causing their deterioration at an accelerating rate.

A considerable amount of high forests was reported to cover the region in the early nineties. According to the document of the Regional Conservation Strategy Office, 40 percent of the region was covered by high forest at that time. Nevertheless, approximately only 7.2 percent was left by the late 1980s (Haile-Yesus, 1996:3, ORCS, 2000:21).

According to some recent estimates about 50,000 to 100,000 hectares of natural forests are lost annually due to shifting of cultivation, commercial agriculture, fuel wood collection, urbanization, forest fires and logging. This drastic reduction in the forest has led to a marked increase in soil erosion. The situation indicates the doomed future unless immediate action is taken.

Biodiversity conservation has taken place in limited areas of the region. There are established protected areas such as national parks, sanctuaries,

natural forest and wildlife conservation areas in the region. Currently there are three national parks, four sanctuaries, two games and eight controlled hunting areas in the region. The parks are, the Awash National Park, the Abjata-Shala Lakes National Park, and the Bale Mountains National Park, and the Dera-Dilfakir Regional Park in Arsi zone.

Oromia is also relatively well endowed with water resources, having a number of the country's major rivers such as Abay (on its left flank tributaries), the Baro, Gibe, Wabe-Shebele, Awash and Deddesa rivers and numerous streams and lakes in the Rift Valley. The aquatic ecosystems in Oromia contain untapped diverse biological resources of high economic and conservation significance. The rivers and the lakes in the region, which vary in size and water quality, are inhabited by endemic aquatic life and serve as nesting and sites for migratory birds, but with very limited attention to their conservation and effective exploitation. The Rift Valley lakes such as Abjata, Ziway, Langano and Shalla are inhabited by the greatest concentration of locally endemic species with spectacular diversity.

Even though the region has a number of wildlife resources, since the last centuries, there has been rapid decrease in both its size and number of species due to indiscriminate hunting of wildlife and the change brought in the natural habitat.

The problem of soil degradation, due to soil erosion in the highlands of the region, is spreading to the well-watered and high potential central (Shewa

and Arsi), southern (Bale and Borena), southwestern (Jimma and Ilu-
abbabor) and western (Wellega) high lands of the region.

According to the reports of the office of the regional conservation strategy, some efforts have been made to arrest soil erosion and land degradation in some highland areas of the region. Initially, the emphasis was on the construction of physical conservation structures such as terraces, soil bands, cut-off drains, gully-plugging etc. This was extended to include the biological measures and closing of hillsides for natural regeneration of vegetation and rehabilitation. However, the efforts have only been limited to Harerge, East Shewa and a small area of Borena zones. In other zones, the efforts made were very low which did not show any significant impact (ORCS, 2000:9)

CHAPTER THREE

3. METHODS AND PROCEDURE OF THE STUDY

3.1 The Methodology

The methodology employed for the study is content analysis. Descriptive survey method was also used to support the study with quantitative data.

Definitions of content analysis change over time with development in technique and with application of the tool itself to new problems and types of materials. Many educators define content analysis as a research technique for the objective, systematic and quantitative description of the manifest content of communication.

Content analysis methodology is applied to analyze the contents of documentary materials such as books, magazines, newspapers and the contents of all other verbal materials, which can be either spoken or printed (Budd et al, 1967:2, Berelson 1952 cited in Holsti, 1969:3, Kothari, 1985:137, Borg and Gall, 1985:511-512, Kerippendorff, 1980:22). The researcher used this definition of content analysis for the study.

The definitions given by different educators for content analysis reveal that the significance of content analysis can be explained by describing the content of communication including written documents. Thus, using content analysis methodology in the analysis of the textbooks is an appropriate methodology.

Descriptive survey method is useful because data from the responses of teachers as well as students demonstrate local environmental problems and the extent of the problems, and thus relevant solutions are addressed in the textbooks. Moreover, Borg and Gall (1983:512) suggest that content analysis is more explanatory when used in conjunction with other studies that

additional data enabled to make the results of the study more reliable. This clearly supports the data gathered through content analysis.

3.2. Sources of Data

The following are used as the sources of data for the study:

- ◆ Science and social studies textbooks prepared for primary schools in Oromia Region because they are relatively more suitable to present environmental issues.
- ◆ Teachers teaching in the primary schools of the region
- ◆ Primary school students in the region

3.3. Sampling Procedure

Sampling designs are of two types: non-probability sampling and probability sampling (Borg and Gall 1983, Kothari, 1985, Budd et al, 1967, Best 1993). In this study, both the non-probability and probability sampling techniques were used. Science and social studies textbooks for Grades five and six were selected purposely for the analysis. The reasons for the selection of these textbooks are:

1. As environmental education comes to express itself in school curricula, it can be dominated by the natural sciences such as biology, geography and other science subjects. Moreover, these subjects are mostly subjected to present the knowledge and skills that pertained to the life of the learner that has to express and manipulate his/her environment (Robottom, 1993:16, Heimlich, 1992:103).

2. From literature and his experience, the researcher is convinced that environmental issues are more likely appeared in these subjects than any other subjects at primary level.

The chapters in the textbooks were sampled using simple random sampling. Fifty percent of the total chapters in the textbooks were sampled. All the paragraphs in the sampled chapters and all illustrations in the entire book were used for the analysis.

Oromia has twelve administrative zones. Among these, four zones (33%) were identified using stratified sampling. The base for stratification is the climatic conditions of the zones. The categories of stratification are the catchments of the zones being high land or low land. The reason for using such categorization is that environmental problems are most likely related with climatic conditions and topography of the land. For example, environmental problems related with water in low lands might be different from that of the high lands. In low land areas, the problem might be the absence of water itself, where as in high lands it could be a matter of quality. Thus, identifying sample zones using stratification becomes reasonable.

Similarly, sample woredas were identified using the same procedure. The identification of the climate of the zones and woredas was based on the categories given by Oromia Disaster and Preparedness Bureau and Oromia Agricultural Development Bureau for the zones and woredas. Accordingly, four zones and eight woredas were selected as samples for data collection (See also Appendix-VI).

Sample schools and sample teachers were identified using simple random sampling. Three schools from each woreda and four teachers (those teaching science and social studies) from each school were identified using simple random sampling. This makes the total number of sample schools twenty-four and total number of sample teachers ninety-six.

Six classroom observations were conducted. This was to gather more data and check how the textbooks for the grade levels address and encourage the learners to demonstrate local environmental problems and propose relevant solutions.

Seventy three students from six sample schools were used for focus- group discussions. These students were selected randomly from both classes. Focus group discussions were designed to identify the main local environmental problems, and the extent they understand the incorporation of environmental issues in the existing textbooks.

3.4. Variables Used

Variables are the conditions or characteristics that the experimenter manipulates, controls, or observes. They are symbols that stand for any one of a set of two or more mutually exclusive values such as objects, states, categories, qualities or elements.

The conditions or characteristics that the experimenter manipulates or controls in an attempt to ascertain their relationship to observed phenomena are termed as independent variables. Independent variables are variables that are antecedent to the dependent variables. The dependent variables are the conditions or characteristics that appear, disappear, or change as the experimenter introduces, removes, or changes the independent variables. They are depending upon or a consequence of the other variable (Kothari, 1985:372; Best, 1993:137; Krippendorff, 1980:88).

In this study the following variables are used for the analysis:

1. availability of environmental elements in the curriculum materials.
2. the approach/es used to present environmental education and,

3. the presentation of local environmental problems into curriculum materials, and suggested ways to help students to solve the problems.

3.5. Categories of Coding

Formulation of categories is very important in content analysis research design. As stated by Budd et.al (1967:39), no content analysis is better than its categories. Categories are variables that are linked to the problem and the theories on which the research based.

Many researchers argue that categories should reflect the purpose of research, be exhaustive, be mutually exclusive, independent and be derived from a single classification principle. Moreover, categories should be chosen according to the nature of the content, the research problem and its goals, and the hypotheses to be tested or the research questions to be attempted (Budd et al. 1967:47, Holsti, 1969:95, Simon, 1996:281).

In this study, five categories were formulated by the researcher and used for coding purpose. Each of the categories has clarifications to make the coding process more suitable. The categories are:

1. Availability of the elements of natural environment. This includes,
 - Vegetation
 - Land (soil, minerals, etc.)
 - Wildlife
 - Water
 - Air and
 - The interaction of man with these elements

2. Presentation of environmental problems

3. Presentation of the activities pertinent to the natural environment
 - Environmental protection and
 - Environmental conservation
4. Illustrations that demonstrate the natural environment
5. Evaluation techniques used to evaluate environmental learning outcomes

3.6. Units of Analysis

Units of analysis are the units that are used for coding and pertinent to the specific segment of content that is characterized by placing in a given category. They are the smallest segment of content counted and scored in content analysis. The most common units of analysis are a word, a sentence, a theme, a paragraph, a symbol, an item, a character, space or time (Budd, et al 1967:33, Holsti, 1969:116, Krippendorff, 1980:57).

Three coding units were used as unit of analysis for the study. For the category “availability of elements of the natural environment”, “Presentation of the activities related to the natural environment” and “Presentation of environmental problems”, the unit of analysis used was the *paragraph*. For the category “Illustrative demonstration of the natural environment”, counting *illustrations* were used. Similarly, for the category “Evaluation techniques” the *evaluation items* were used as units of analysis.

3.7 Instruments Used for Data Collection

The researcher developed four types of data collection instruments. These are:

1. **Coding Sheets:** Coding sheet provides answers to the major questions about the content and contain information in its primary and most explicit form (Budd et. al 1967:40, Krippendorff, 1980:81). Thus, coding

sheets were suitable to have and handle data for a study that underway content analysis methodology. A coding sheet was developed for each category and employed (See Appendix-I).

2. Questionnaire

Both open ended and closed-ended questionnaires were used to collect data from teachers (See Appendix-II). The data collected using a questionnaire enable to investigate how environmental elements and local environmental problems are presented in the textbooks under the study. All the questions in questionnaires were structured that they are definite, concrete and pre-determined questions.

3. Focus-Group Discussions

Focus-group discussions were conducted with students in the sample schools. Six questions were developed by the researcher and used as leading questions for discussion (See Appendix-IV). Other questions were forwarded based on the responses made during discussions.

4. Checklist

Structured classroom observations were designed to collect the data on how environmental issues are presented in the classroom (See Appendix-V). The appearance of local environmental problems and related solutions to the problems could also investigated through observations. However,

due to that the topics during observations were not related to environmental issues, data from Classroom observations were not used.

3.8 Procedure of Data Collection

Reliable data could be collected if the sources are clear about the purpose of the study, and have clear idea about the instruments used for data collection. To this end, the following procedures were followed during the data collection.

Training of Coders

Training of coders is one of the essential preparatory task in content analysis because coders have to be acquainted with the peculiarities of the recording task (Krippendorff, 1980:72). This is to decrease coding barrier among coders and increase the reliability of coders to collect suitable and reliable data. Accordingly, two coders were who have B.Sc. degree and have experiences of twenty and thirteen years in the field of teaching and curriculum development were selected for coding.

A training manual was developed by the researcher and commented on by the advisor. After the necessary improvements were made on the manual, a one-day training was provided for the coders on the following basic issues:

1. The purpose and the method of the study
2. Definitions of the categories and units of analysis
3. Overview of the materials under the study
4. Definitions of some key terms used in the study that may have significance during coding
5. Steps to be followed during coding

Discussions were made on the above and other procedural issues finally a common consensus was arrived between the two coders and the researcher as well.

Before conducting the actual coding, trial run was conducted by the two coders on limited chapters of the selected textbooks for the analysis, and the reliability of inter-coders agreement was calculated.

Reliability of Coding

Reliability means simply that investigators using the same techniques on the same material to get substantially the same results. It is a function of coders, insight and experience, clarity of categories and coding rules which guide their use, and the degree of ambiguity in the data (Holsti, 1969:135, Krippendorff, 1980:63).

Reliability test is, therefore, the basic requirement for the inter agreement between coders. The main reason for testing reliability (Holsti, 1969) is, the nature of the data is usually beyond the investigator's control and opportunities for enhancing reliability are generally limited to improving coders, categories, or both.

To attempt the reliability between the two coders, statistical analysis were calculated and determined using a chance factor or pie coefficient. The agreement between the two coders

was determined using the formula (Holsti, 1969:140; Scott, in Amare, 1998:7, Krippendorff, 1980:138),

$$\pi = \frac{P_o - P_c}{1 - P_c}$$

Where, π = the coefficient of agreement between the two coders

P_o = the observed percentage agreement

P_c = the percentage agreement expected by chance.

As a result of trial run, a co-efficient of reliability of 0.82 was maintained (for detail statistics see Appendix-IX). This enabled the researcher to confidently use the two-trained coders for the main coding. In addition to the statistical test for the reliability, comments by the advisor and other professionals in the field of education were considered.

Originally, questionnaires were prepared in English, but translated into Afan Oromo since the respondents were more comfortable to respond in Afan Oromo. Questionnaires were tested in three near - by schools, and improvements were made based on the results of the pretest and comments by the advisor. The researcher briefed purpose and objectives of the study and how to respond the questionnaires to the subjects of the study.

3.9 Methods of Data Analysis

The results from the coding of the textbooks were summarized and tabulated. The incorporation of environmental elements in the textbooks is analyzed with reference to the syllabuses developed by ICDR for respective subjects. This was done by investigating the presentation of the objectives

related to environmental education stated in the syllabuses. Presentation of environmental problems in the textbooks was analyzed in accordance with the problems identified by the teachers and students.

Percentage comparisons were used to show the presentation of environmental issues (environmental elements, problems and related solution) in the textbooks of the subjects under the study. Lastly, how environmental education is integrated in the studied subjects was analyzed in accordance with the country's education policy and environmental policy and in line with the experiences of other countries. Triangulation of the data gathered from content analysis, teachers and students was used for the analysis.

CHAPTER FOUR

4. PRESENTATIONS AND ANALYSIS OF DATA

This chapter deals with the presentation and analysis of the data gathered through coding procedures, from questionnaires and focus group discussions.

The first section of this chapter presents the raw data in its organized form in accordance with the objectives of the study. This includes:

- Elements of the natural environment, environmental problems and the activities forwarded in the textbooks and,
- Responses of teachers and students

The second section deals with the analysis of the data in section one by focusing on the basic questions of the study. The analysis focused mainly on environmental issues that are incorporated in the textbooks in relation with what is suggested in the corresponding syllabuses.

From the time of its establishment, the Oromia Education Bureau has done some basic tasks in formal and non-formal education programs. The development of primary education curriculum with special attention to the environment is quite found to be a fundamental necessity at present. This is affected through the inclusion of environmental matters mostly in natural science and social studies subjects for Grades one to eight. The Federal Ministry of Education and the Education Bureau have recently given greater attention to the incorporation of environmental issues in the curriculum.

At middle grades of primary (Grades 5-6), the following subjects are provided: Natural science, Social studies, Mathematics, English, Afan Oromo, Amharic, Music, Arts and Physical education. Among these, the researcher believes that Natural science and social studies subjects have to entertain environmental education relatively more than other subjects do. That is why the study is focused to investigate the incorporation of environmental issues in these subjects.

4.1. Profile of Sources of Data

As stated earlier, the textbooks used for the study are science and social studies for Grades five and six prepared for primary schools in Oromia. The

textbooks are prepared in Afan Oromo. Table-1 below provides some details of these materials.

Table-1 Some Profiles of the Textbooks

<i>Name of Textbooks</i>	<i>Number of Chapters</i>			<i>Number of pages</i>		
	<i>Total</i>	<i>Sampled</i>	<i>%</i>	<i>Total</i>	<i>In Sample Chapters</i>	<i>%</i>
Science Grade - 5	11	5	45.4	194	97	50.0
Science Grade -6	9	5	55.5	220	126	57.3
Social Studies Grade -5	7	3	42.8	152	66	43.4
Social Studies Grade-6	7	4	57.1	169	115	68.0
Total	34	17	50.0	735	404	55.0

The above table shows that 50% of the total chapters and 55% of the total pages of the textbooks were used for the analysis. This enables the researcher confidently to make generalisations from the findings.

Another source of data was primary school teachers currently teaching science and social studies in the region. Ninety teachers were used to respond the questionnaires. Their background is indicated in Table-2 below.

Table-2 Background of the Teachers Responding the Questionnaires

<i>Educational Qualification</i>	<i>Sex</i>				<i>Total</i>	<i>%</i>
	<i>Male</i>	<i>%</i>	<i>Female</i>	<i>%</i>		
Grade 12 and below	-	-	-	-	-	-
TTI Graduate	68	75.5	17	18.9	85	94.4
Diploma	5	5.6	-	-	5	5.6

Degree and above	-	-	-	-	-	-
Total	73	81.1	17	18.9	90	100

Even though the intent of the study is not to investigate the quality of teachers at a given grade levels, Table-2 shows how the teaching-learning process including that of environmental education, is affected by the low quality of teachers. From the table, 94.4% of the teachers teaching Grades five and six in the region are below the required qualification, which is a minimum of diploma. The share of female teachers is also very low, only 18.9%.

Students were also used as a source of data through focus group discussion. Out of 73 students used for focus group discussion, 47 (64.4%) were males and 26 (35.6%) were female. The distributions among the two classes were 53.4% and 46.6% from Grades five and six respectively.

4.2. Textbook-Syllabus Relations

It is evident that in most cases textbooks are developed based on the curriculum guide, the syllabus. A syllabus contains learning objectives, contents, teaching/learning methods and evaluation techniques. This enables textbook writers to make a framework for the depth and width of the material.

Objectives stated in the syllabus describe what the learner will be able to do when the learning process has been successfully completed. Textbooks are therefore, prepared to support the attainment of these objectives and to facilitate the learning process. Accordingly, the textbooks under the study were prepared to attain the objectives stated in the syllabuses developed by ICDR.

Analysis of the incorporation of environmental issues in these textbooks is made in accordance with the objectives stated in the corresponding syllabuses. Thus, in this section the relationship of the textbooks with their respective syllabuses emphasizing on the environmental issues will be presented and discussed.

4.2.1. Content Relations

Contents in the syllabuses are organized in such a way that they keep the pedagogical relationship of contents and their integrity. This is because contents are clearly influential both on the processes of textbook development and on the learning process. Analysis of the content relation between the textbooks and the respective syllabuses were made. The investigation of their relationships is summarized in the Table-3 below.

Table-3 Relation of Syllabuses and Textbooks Contents

<u>Contents in the Syllabus</u>	Contents in the Textbook
Science Grade-5	

<ol style="list-style-type: none"> 1. Breathing system and respiration 2. Human nervous system 3. Hormones 4. Reproduction in animals 5. Conservation in plants 6. Conservation of Resources 7. Force, Machines and Energy 8. Classification of Substances 	<ol style="list-style-type: none"> 1. Reproduction in plants 2. Reproduction in animals 3. Breathing systems and respiration 4. Hormones 5. Human nervous systems 6. Forces and simple machines 7. Light 8. Transfer of heat 9. Electricity by nature 10. Substances and their classification 11. Conservation of natural resources
Science Grade-6	
<ol style="list-style-type: none"> 1. Basic Environmental KAP 2. Diseases 3. Physical bodies and their common properties 4. Light 5. Sky 6. Reproduction 7. Plants 8. Some important compounds 9. Making some simple machines 	<ol style="list-style-type: none"> 1. Plants 2. Reproduction in human beings 3. Diseases 4. Physical bodies 5. Light 6. The sky 7. Some important compounds 8. Making things 9. Our environment
Social Studies Grade-5	
<ol style="list-style-type: none"> 1. African natural environment 2. African People 3. African People and their Culture 4. African Resources 5. Government systems & democracy 6. Organization of African unity 7. Great thoughts of Africa 	<ol style="list-style-type: none"> 1. Formation of African Continent 2. African People and their Environment 3. African people and their culture 4. African Resources 5. Government systems and democracy 6. Organization of African Unity 7. Great thoughts of Africa
Social Studies Grade-6	
<ol style="list-style-type: none"> 1. The Universe and our world 2. World peoples, culture and languages 	<ol style="list-style-type: none"> 1. The universe and our world 2. World people 3. Great thoughts of the world

3. Great thoughts of the world	4. Great civilizations of the world
4. World great civilization	5. Historical heritages
5. World heritages	6. Government systems & democracy
6. Government systems and democracy	7. International relations
7. Major world economic and international relations	

As can be observed from Table-3, there is significant variation of the order of contents in the textbooks with that of the syllabuses, particularly regarding the contents related to environmental education. In Grade five science, for example, the unit that is relatively appeared to present environmental issues is unit six in the syllabus, where as in the textbook it is the last unit, unit eleven. Similarly, in Grade six science, the unit that stands first in the syllabus (Basic Environmental KAP) is the last (unit nine) in the textbook.

In Grade five science, there are eight units in the syllabus where as it is eleven in the textbook. This is due to that unit seven in the syllabus is split into four distinct units. It is of course reasonable to present these units in such a way that they are more comfortable to present and to learn the topics.

Bringing environmental related units at the end of the textbooks by itself has certain implications. When students were asked the availability of environmental contents in the textbooks, they claimed that environmental related topics are presented at the end of the textbooks. Whenever there is

certain disruption in a school schedule, they miss to learn these units. This, therefore, as stressed by students, is a refusal or giving less emphasis for environmental education.

However, according to the regional curriculum development experts, these units were brought at the end of the textbooks to relate the lesson with the seasons when sufficient amount of water and variety of plants are commonly found in the region. But, when we analyse this with what students claimed it is a failure for two reasons. First, green plants, especially different types of flowers are more available at the beginning of a year (Ethiopian New Year) than at the end. Water is also found adequately during this time. Second, it is more essential for the students to learn with what they have in their environment than missing it at all in case of certain disruptions.

In social studies, there is no single unit prepared to present environmental education. Regardless of this, the units in the syllabuses are presented in the textbooks with some topic modifications. For example, in Grade five, the unit "African Natural Environment" (unit one) in the syllabus is sated as "Formation of African Continent" in the textbook, which seems totally to present another issue.

4.2.2. Presentation of the Objectives

As stated earlier, the researcher and one of the coders identified objectives in the syllabuses, which are set to teach environmental issues. These objectives (See also Appendix-VIII) are summarized in Table-4 below.

Table-4 Appearance of Objectives Related to Environmental Education

No	Syllabus	Total No of Objectives	Objectives related to environmental Education	%	Environmental Objective not discussed in the textbooks	%
1	Science Grad-5	108	39	36.1	1	2.6
2	Science Grade-6	85	28	32.9	2	7.1
3	Social Studies Grade-5	91	15	16.5	4	26.7
4	Social Studies Grade-6	42	6	14.3	2	33.3
Total		326	88	27.0	9	10.2

As indicated in Table-4, objectives that are stated to address environmental issues appeared more in science subjects than social studies. Thirty six percent and 32.9 percent of the objectives of Grades five and six science syllabuses respectively are designed to teach environmental issues. Whereas social studies syllabuses share relatively very small, that is 16.5 percent in Grade five and 14.3 percent in Grade six. This shows that science is more appealing to teach environmental education as compared to social studies. However, the interest here is not to reason out why science materials contain more objectives related to environmental education than social studies. Rather, how much of, even, the stated objectives are explained in the textbooks.

Investigation of these objectives reveals that some objectives are totally not explained in the textbooks. Social studies materials tend to loose relatively more environmental objectives. As can be seen from Talbe-4, four or 26.7%

objectives from Grade five and two or 33.3% objectives from Grade six are not explained in the textbooks at all. Some of these objectives are the following:

- describe the effects of deforestation (science grade-5, p:10)
- clarify their environmental related values (science grade-6, p:1)
- show the highlands of Africa on a map (social studies-5, p:2)
- describe water resource in Africa (social studies-5, p:5)
- show world weather conditions and distribution on a map (social studies grade-6, p:10)
- describe causes of climatic disturbances and its effects (social studies grade-6, p:10)

It is evident that a stated objective should have to be taught. One way of transferring or inspiring these objectives to the students is explaining them in the textbooks so that students could read and maintain the required learning. However, significant numbers of objectives related to environmental issues are not discussed in the textbooks.

4.3. Availability of Environmental Elements

As discussed in the introductory part of the study, environmental elements are those pertinent to the natural environment. These elements are so diffused and scattered in the curriculum that their identification is some

times difficult. Nevertheless, investigation of some major elements was made for the research purpose.

The availability of these environmental elements in the textbooks was searched through coding procedures by attempting the extent that these elements are appeared in the textbooks. The result of the investigation is summarized in Table-5.

Table-5 Availability of Environmental Elements in the Textbooks

Environmental Elements	Science-5 (N=253)		Science-6 (N=242)		Social Studies-5 (N=258)		Social Studies-6 (N=404)		Total (N=1157)	
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
Vegetation (trees, bushes, grass etc)	83	32.8	104	43.0	21	8.1	30	7.4	238	20.6
Land (Minerals, Soil)	58	22.9	51	21.1	34	13.4	75	18.6	218	18.8
Wildlife	26	10.3	89	36.8	12	4.7	11	2.7	138	11.9
Water	58	22.9	44	18.2	38	14.7	22	5.4	162	14.0
Air	23	9.1	5	2.1	23	8.9	32	7.9	83	7.2
Interaction between Man & Nature	38	15.0	75	31.0	28	10.9	22	5.4	163	14.1
<i>Average</i>	47.7	18.8	61.3	25.3	26	10.1	32	7.9	167	14.4

N= Number of paragraphs

As shown in Table-5 all the identified environmental elements in the textbooks a pear with varied degrees.

About 18.8 and 25.3 percent of science for Grades five and six respectively encompassed environmental elements. Similarly, in social studies materials 10.1 and 7.9 percent respectively tend to present environmental elements.

With regard to a particular environmental element, issues related to vegetation are demonstrated relatively more than others (20.6%), and elements related to air shared the least, that is only 7.2 percent. Issues related to land and the interaction of man with the natural environment stand second (18.8%) and third (14.1%) respectively.

However, the difference in the share of environmental elements in the textbooks does not necessarily show that one element is more emphasized than the other is. Rather the emphasis could be enlightened according to their importance, the support they give to human life.

Overall investigations of the materials indicate that 14.4 percent of the textbooks explain environmental elements. It is difficult to conclude here that such amount is adequate or not, because, the subjects have to encompass many other disciplines such as health, politics, culture, history, civics, scientific discoveries and others. Rather, what is encompassed is analysed with what is suggested in the syllabuses and the responses of the teachers and the learners.

Teachers were asked to rate to what extent the textbooks incorporate environmental issues. Accordingly, the following results were obtained.

Table-6 Rating Scale for the Availability of Environmental Elements

Textbook	Good		Average		Poor	
	f	%	f	%	f	%
Science Grade-5 (N= 24)	14	58.3	4	16.7	6	25.0
Science Grade-6 (N=24)	10	41.7	9	37.5	5	20.8
Social Studies Grade-5 (N=20)	9	45.0	8	40.0	3	15.0
Social Studies Grade-6 (N=22)	8	36.4	8	36.4	6	27.3
Total (N=90)	41	45.6	29	32.2	20	22.2

N= Number of respondents

As can be seen from Table-6, 58.3% of respondents said that science for Grade five is good at incorporating environmental elements, where as for all other materials it is below average. More than 45 percent of teachers said the textbooks are good at incorporating environmental elements and 32.2 percent said they are average. Among the textbooks, social studies for Grade six is rated the least to integrate environmental elements. The two results (that of coding and from teachers response) support each other.

Even though they do not complete the course of the year, students also argued that the materials lack environmental issues, particularly in demonstrating their local environmental problems. For example, students

from low land areas, such as Borena and East Shoa, said that textbooks have to address and explain ways of preserving water as shortage of water is the most sever problem in low land areas.

4.4. Presentation of Environmental Problems

As stated in many UNESCO documents and environmental policies of many countries, the major pressing environmental problems in our to days world are the clearing of natural vegetation, land degradation, pollution and the indisputable danger of climatic change. Most of these problems have a worldwide nature. Presentation of environmental problems in the textbooks was investigated. The results of the investigation are summarized in Table-7.

Table-7 Environmental Problems Presented in the Textbooks

Environment al Problems	Science-5 (N=253)		Science-6 (N=242)		Social Studies-5 (N=258)		Social Studies-6 (N=404)		Total (N=1157)	
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
Clearing of natural Vegetation	8	3.2	11	4.5	3	1.2	2	0.5	24	2.1
Land degradation	7	2.8	7	2.9	3	1.2	2	0.5	19	1.6
Erosion	7	2.8	5	2.1	2	0.8	2	0.5	16	1.4
Desertification	-	-	1	0.4	2	0.8	2	0.5	5	0.4
Killing Wildlife	5	2.0	6	2.5	-	-	-	-	11	0.9
Pollution (Water & Air)	1	0.4	15	6.2	-	-	4	1.0	20	1.7
Over	4	1.6	4	1.7	4	1.5	4	1.0	16	1.4

Population										
Total	32	12.6	49	20.2	14	5.4	16	4.0	111	9.6

N= Number of Paragraph

The above table shows that almost all the textbooks address environmental problems. Investigation for the type of problems explained reveal that the problem of natural vegetation shares the largest (2.1%), and desertification is the least (0.4%). Teachers were asked to identify problems that are addressed in the textbooks. Accordingly, the following result was obtained.

Table-8 Environmental Problems as Viewed by Teachers

<i>Environmental Problems</i>	<i>Science-5 (N=24)</i>		<i>Science-6 (N=24)</i>		<i>Social S. -5 (N=20)</i>		<i>Social S. -6 (N=22)</i>		<i>Total (N=90)</i>	
	<i>f</i>	<i>%</i>	<i>f</i>	<i>%</i>	<i>f</i>	<i>%</i>	<i>f</i>	<i>%</i>	<i>f</i>	<i>%</i>
Distracting natural vegetation	22	91.7	23	95.8	18	90.0	18	81.8	81	90.0
Land degradation	20	83.3	20	83.3	11	55.0	15	68.2	66	73.3
Erosion	19	79.2	20	83.3	10	50.0	16	72.7	65	72.2
Killing wildlife	18	75.0	20	83.3	12	60.0	10	45.5	60	66.7
Pollution	18	75.0	22	91.7	10	50.0	11	50.0	61	67.8
Desertification	-	-	-	-	1	5.0	-	-	1	1.1
Over	20	83.3	18	75.0	10	50.0	12	54.5	60	66.7

Population										
<i>Average</i>	<i>16.7</i>	<i>69.6</i>	<i>17.6</i>	<i>73.2</i>	<i>10.3</i>	<i>51.5</i>	<i>11.7</i>	<i>53.2</i>	<i>56.3</i>	<i>62.5</i>

N= Number of respondents

Table -8 depicts what is obtained from coding procedures stated in Table-7. A significant number of teachers said that environmental problems are explained in science and social studies materials. More than 69 percent of teachers said that science textbooks demonstrate environmental problems, and about 50 percent of the teachers said social studies materials encompass these problems. Similar the results of content analysis, the problem of vegetation shares the highest, and deforestation the least.

The appearance of environmental problems in the textbooks is not uniform. This shows that the severity of the problems is not uniform and equally felt by all individuals in all areas. For example, the problem of water is more sever in low lands than in high lands.

When students were asked to discuss environmental problems in their locality, they identify the following:

- cutting down of trees, burning of bushes, forests and grass lands**
- decreasing of land fertility due to erosion, over-cultivation and overgrazing**

- **extermination of wildlife due to culture based recreational activities and in some areas for food**
- **absence of clean water particularly in lowlands**
- **overpopulation (particularly in highlands), which is the cause for most of environmental problems**

They also stressed that the main reason for the devastating of the natural environment is lack of appropriate education about the environment and the painstaking poverty spread all over the country.

From their discussion, students have good understanding of nature and have a concern for their environment. However, they lack how to act to their environment and unable to see in its totality, rather, focusing on particular problem or issue. For example, they have no clear insight about the interrelationship of environmental problems.

It is reasonable to expect from the materials to address the ways of combating these problems. Investigation was also made whether the materials suggest certain solutions or not. Accordingly, 2.4

percent of the paragraphs in the materials discuss how to combat environmental problems. Students also argued that the materials (especially science materials) suggest some ways of tackling these problems however, they reported that solutions are not exhaustive enough.

4.5. Activities Related to Environmental Education

Environmental education is an educational innovation that requires not only knowledge development but also learning for skill development. It demands the movement of muscles and physical investment to have the right insight of the environment. Therefore, it is reasonable to examine the activities demonstrated in the textbooks that are performed by the students in learning about the environment.

Environmental activities are mainly environmental protection and environmental conservation. These activities are comprehensive and require integrated involvement rather than particular action. One way of promoting these activities is introducing them in formal curriculum.

Analysis of the incorporation of environmental activities in the materials was made and the following table presents the results obtained.

Table-9 Appearance of Environmental Activities in the Textbooks

<i>Textbooks</i>	<i>Environmental Activities</i>					
	<i>Environmental Protection</i>	<i>%</i>	<i>Environmental conservation</i>	<i>%</i>	<i>Total</i>	<i>%</i>
Science Grade-5 (N= 253)	25	9.9	55	21.7	80	31.6
Science Grade-6 (N= 242)	9	3.7	38	15.7	47	19.4
Social Studies Grade-5 (N= 258)	2	0.8	3	1.1	5	1.9
Social Studies Grade-6 (N= 404)	4	1.0	3	0.7	7	1.7
<i>Total (N=1157)</i>	<i>40</i>	<i>3.4</i>	<i>99</i>	<i>8.6</i>	<i>139</i>	<i>12.0</i>

N= Number of Paragraphs

Table-9 shows that almost all the textbooks analyzed contain some amount of environmental activities. Overall observation shows that 3.4 percent of the materials focus on protection and 8.6 percent on conservation. However, environmental protection and conservation have to go parallel. In most cases

destructions, which mostly require protection, exceeds the activity of rehabilitation. This cannot enable maintaining sustainable environmental development and appropriate utilization of natural resources. Particularly in countries like Ethiopia, where natural resources are yet not exploited by modern technologies and industries, protecting natural resources from unwise use and destruction is indispensable.

Analysis of particular materials reveals that 31.6 percent of Grade five science and 19.4 percent of Grade six science materials are used to forward environmental activities that are to be performed by students. Social studies materials tend to share the least, which are only 1.9 percent in Grade five and 1.7 in Grade six to demonstrate environmental activities.

Most of the activities suggested in the textbooks are practical activities. For example, Grade five science textbook (p: 178) asks students to purify water using different mechanisms such as filtration and boiling, which do not require any expense. Similarly, in Grade six social studies (p: 54) ways of protecting soil erosion are suggested to be exercised by the students.

4.6. Illustration

Illustrations are very important for conveying concrete images and visual and spatial concepts

(Hartley, 1985:80). They are used for providing support materials when teaching or learning a concept. The significance of using illustrations, particularly, in demonstrating nature is very essential. Investigation of illustrations was made by identifying whether a picture is used to portray environmental issues or not in the textbooks. Accordingly, the following table presents the data.

Table-10 Illustrations Portraying Environmental Issues

<i>Textbook</i>	<i>Number of Illustrations</i>		
	<i>Total</i>	<i>Related to Environmental Education</i>	<i>%</i>
Science Grade - 5	147	73	49.7
Science Grade - 6	157	67	42.7
Social Studies Grade - 5	49	14	28.6
Social Studies Grade -6	83	20	24.1
<i>Total</i>	<i>436</i>	<i>174</i>	<i>39.9</i>

Table-10 shows that 174 or 39.9 percent of the illustrations in the materials are used to portray environmental education in one way or the other. Regardless of their quality, almost all the issues pertinent to the natural environment are supported by illustrations. For example, the pictures in Grade

five science (p: 171) demonstrate farming on hill side across the slope and (p: 185) cutting down of trees or clearing of forests. Investigation of particular material shows that science materials use more number of illustrations than social studies do.

4.7. Approaches Used to Incorporate Environmental Education

Environmental education is an educational innovation, which tends to a variety of student-initiated activities and involvements dealing with real life problems. This characteristic of environmental education requires some definite approach that helps the participatory ways of teaching or learning.

As expressed in the literature review, many countries have adopted the strategy of "infusing" the subject matter into different disciplines of the traditional curriculum in their attempt to integrate environmental elements with general education curriculum. This is clearly an invitation for a multi-disciplinary approach, particularly, at the primary levels.

An investigation was made on how environmental issues are integrated in the textbooks. Table-11 shows the responses given by the teachers on the incorporation of environmental issues in the materials.

Table-11. How Environmental Elements Are Incorporated

<i>Textbook</i>	<i>As a single unit</i>	<i>Incorporated in different units</i>	<i>Both</i>
Science Grade -5 (N=24)	15 (62.5%)	7 (29.7%)	2 (8.3%)
Science Grade -6 (N=24)	15 (62.5%)	6 (25%)	3 (12.5%)
Social Studies G -5 (N=20)	0	18 (90%)	2 (10%)
Social Studies G -6 (N=22)	0	20 (90.9%)	2 (9.1%)
<i>Total (N=90)</i>	<i>30 (33.3%)</i>	<i>51 (56.7%)</i>	<i>9 (10%)</i>

N= Number of respondents

As can be seen from table-11, science materials encompass environmental issues, both as a single unit and by infusing into different units. More than 60% of the teachers said that there are particular units in science materials that are developed to address environmental education. Inspection through these materials also reveals there is one unit in each of science material that focuses on environmental education.

Environmental issues are also explained in other units. For example, under the unit "Some Important Compounds", issues of pollution are discussed. In addition, under the unit "Breathing System and Respiration", pollution of air is explained. About 90 percent of the respondents said that environmental issues are incorporated into different units in social studies materials. This is evidenced by the fact that

some units address some environmental issues. For example, in Grade six, the unit "The Universe and Our World" addresses issues such as formation of land, relationship of plants and animals, major sources of water, types of forests and many others. There is no single unit in these materials, which presents only the issues of the natural environment. Rather, they incorporate environmental issues by infusing.

About 56 percent of the teachers said that environmental education is incorporated in the materials by infusing environmental issues into different topics of the materials. This is of course in harmony with what many educators such as Heimlich, 1982, Disinger and Howe 1992, Trisler, 1993 and Tomera et.al. (1987) suggest.

There is no distinct approach, however, which is perfectly suitable to teach environmental education. Nevertheless, many educators suggest the infusion of environmental issues into different school subjects. For example, Heimlich (1992:10) describes that the infusion approach attempts to integrate environmental issues into the school subjects because it streamlines the knowledge, skills attitudes experience and commitment that will result in informed decisions, responsible behavior and constructive actions. Others such as Trisler (1993:89) also stress the significance of the infusion of environmental issues into the existing courses that contents and skills are integrated to focus on that

content without losing the integrity of the courses themselves.

Both teachers and students were asked to express their feeling about the approach used to teach/learn environmental education. Accordingly, 62.2 percent of teachers and 83.3 percent of the focus group students said that it is suitable if environmental education is presented through other disciplines. Only 37.8 percent of the teachers and 16.7 percent of focus group said that environmental education has to be taught as a distinct subject. According to these respondents, the emphasis currently given to environmental education is relatively less where the problem outstrips the efforts made. As to this group, it is very essential to introduce environmental education into the school curriculum as a subject so that other disciplines could be rather taught through environmental education.

4.8. Evaluation

It is clear that the conventional methods and techniques of evaluation adopted at the school level are inadequate for environmental education because of its certain unique characteristics, viz.,

- problem-oriented**
- student - initiated activities and investigations**
- community oriented strategies**

Environmentalists also argue that the usual paper-pencil type of tests normally used for pupil evaluation in the other subjects of the school curriculum, and confined mainly to the cognitive domain are totally inadequate to meet the evaluation needs of this subject area (UNESCO, series 17:134). Regardless of teacher-designed techniques for evaluations, the items stated in the textbooks are set to help students to conduct self-evaluation. Teachers could also use these items to evaluate their learners.

Attempts were made to investigate evaluation items set to evaluate environmental performance of the students. Accordingly, the following results were obtained.

Table-12. Items Used to Evaluate Environmental Performance

<i>Textbook</i>	<i>Items Related to Environmental Education</i>	<i>%</i>	<i>Objective Type</i>	<i>%</i>	<i>Subjective Type</i>	<i>%</i>
Science Grade -5 (N=141)	92	65.2	9	9.8	83	90.2
Science Grade -6 (N=254)	67	26.4	22	32.8	45	67.2
Social Studies Grade -5 (N=47)	8	17.0	4	50.0	4	50.0

Social Studies Grade -6 (N=137)	25	18.2	12	48.0	13	52.0
<i>Total (N=579)</i>	<i>192</i>	<i>33.2</i>	<i>47</i>	<i>24.5</i>	<i>145</i>	<i>75.5</i>

N= Number of evaluation items

Table-12 shows that 75.5 percent of the items set to evaluate environmental issues are subjective type, and 24.5 percent are objective type. Large number of subjective type items does not necessarily indicate they are appropriate to evaluate environmental education. However, subjective type items are more useful to evaluate the attitudes, when compared to objective type items.

A practical and activity oriented type of evaluation is the most appropriate to evaluate environmental learning outcomes. Thus, an investigation was made on how many of the items are activity oriented to evaluate environmental learning outcomes, and to investigate the learners' environmental attitudes and decision making capacities.

Table-13. Activity Oriented Evaluation Items

<i>Textbooks</i>	<i>Environmental Related Items</i>	<i>Activity oriented Items</i>	<i>%</i>	<i>Non-Activity Oriented items</i>	<i>%</i>

Science Grade - 5	92	4	4.3	88	95.7
Science Grade - 6	67	3	4.5	64	95.5
Social Studies Grade -5	8	1	12.5	7	87.5
Social Studies Grade-6	25	0	0	25	100
<i>Total</i>	192	8	4.2	184	95.8

Table-13 shows that almost in all materials there is lack of activity oriented items. Particularly, Grade-six social studies materials do not suggest a single item through which students' performance is evaluated through practical evaluation. This is, however, directly in opposition with what most educators suggest for environmental education.

CHAPTER FIVE

5. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This chapter presents the summary of the findings and the conclusions made based on the findings. The summary part presents the main findings from the discussions and the analysis made in chapter four. Based on this findings, conclusions are drawn to answer the research questions. The last section of

this chapter is the recommendations forwarded by the researcher that enable any responsible body or institution to make decisions in transforming environmental knowledge for the learners in schools.

5.1. Summary

The data presented and discussed in chapter four is meant to answer the research questions stated for this study. Based on the data and discussions, each of the research questions was treated. Accordingly, the findings obtained from the data and discussions can be summarized as follows:

The environmental elements identified for the research purpose and stated in the syllabuses are mostly explained in the textbooks. Among these "vegetation" is presented and explained in all textbooks relatively most frequently. Land and issues related to land, land use and the interaction of man with natural environment stand second and third respectively. Environmental element that appeared least in the materials is issues related to air.

Among many of the environmental elements presented in the textbooks, the following are appeared in all the materials used for the study:

- Vegetation (plants, trees, bushes, grass and grass lands and all plant species)**
- Land (Formation, uses, soil, minerals)**

- **Wildlife**
- **Air**
- **The interaction of man with natural environment**

In order to answer the question of what environmental problems are incorporated in the textbooks, identifying the problems in the textbooks is another aspect of the investigation. The results of the study show that most of the materials present environmental problems that are pertinent to natural environment. Problems related to the clearing of natural vegetation appear in all the materials relatively most frequently. More than 10 percent of the total body of the materials used to present or discuss environmental problems. Among the environmental problems presented in the textbooks the following share the highest according to their order of appearance:

- **Clearing of natural vegetation**
- **Land degradation**
- **Pollution of water and air**
- **Overpopulation and**
- **Erosion**

Regarding, the question "how are environmental education integrated in the textbooks?" the following results were obtained. The contents of environmental related topics are appeared in all textbooks.

- In science materials (both in Grades five and six), there is one particular unit in each explaining environmental issues distinctly. Other units encompass environmental issues by incorporating into different topics.**
- Social science materials contain relatively fewer number of environmental topics, and there is no particular unit that explains environmental issues. However, environmental issues are infused into different units of the materials.**

With regard to the activities, conservation activities are more explained than protection. About 8.6 and 3.4 percent of the body of materials present environmental conservation and environmental protection activities, respectively. Overall observation shows that 12 percent of the materials focus on environmental activities.

Evaluation of environmental performance was conducted by counting evaluation items used to evaluate environmental learning outcomes. Accordingly, in all the textbooks out of 579 items 192 (33.2%) items are used to evaluate environmental knowledge. Out of these 145 (75.5%) are subjective type and 47 (24.5%) are objective type. Only 8 (4.2%) of the items tend to evaluate through practical activities, whereas the rest, (95.8%) are written or oral type questions.

The last but not least question of the study was designed to gather data on the current position of environmental education in the second cycle curriculum of the region to address local environmental problems and relevant solutions.

Accordingly, the results of the study shows that the main environmental problems in the region include:

- **cutting down of trees, burning of forests, bushes and grass land**
- **decreasing of the fertility of land (land degradation) due to erosion, over cultivation and overgrazing**
- **absence of clean water**
- **overpopulation and**
- **the extinction of wildlife**

All these problems are presented in the materials, however, with relatively insignificant amount in social studies. For example, 4% of the paragraphs in Grade six social studies are used to present these problems. Among the problems identified, clearing of vegetation takes the highest. It is also takes the highest share in the presentations.

With regard to the solutions suggested, it is found that all the materials have drawbacks in suggesting solutions to combat/overcome/ environmental problems. Overall investigation shows that only 2.4 percent of the materials demonstrate solutions for the stated environmental problems.

5.2. Conclusions

The purpose of integrating environmental education in formal curriculum is to create awareness, change attitudes, provide young people the knowledge of the environment, equip them with skills to identify and solve environmental problems. This is not only to produce citizens who are responsible for their environment, but also to encourage pupils in primary schools who have a significant role to play in promoting basic concepts of sustainable environmental development.

Textbooks, therefore, have to provide pupils with necessary and relevant environmental information since they are the only materials prepared for pupils in countries like Ethiopia. The contents, approaches, illustrations and evaluation techniques in the textbooks have to influence the environmental knowledge of the learners.

Investigating overall environmental qualities of curriculum materials is tedious and require field study. However, efforts have been made to evaluate the availability of environmental elements and the way environmental education is integrated into the curriculum materials by using the categories developed by the researcher and using the syllabuses developed by ICDR as a frame of reference.

Accordingly, on the basis of the findings and the results obtained, the following conclusions are drawn:

- 1. Most of the textbooks have encompassed environmental elements. However, in some materials such as social studies, environmental elements are scarcely distributed.**

- 2. A significant number of objectives in the syllabuses, which were stated to teach environmental issues, are not treated in the textbooks.**
- 3. Science material for both grades present environmental topics at the end for which students can loose these topics incase of any disruptions in school schedules.**
- 4. Most of the environmental problems observed in the region are discussed in the textbooks. However, ways of combating these problems is not treated thoroughly in the textbooks. Solutions to overcome environmental problems are not widely treated.**
- 5. The materials demonstrate activities related to environmental education. However, most of**

the activities focus on the conservation of natural resources. Insignificant number of activities portrays the protection of the environment.

6. The textbooks are used the infusion approach to incorporate environmental issues. That is, environmental issues are explained being incorporated into different topics.

7. Most of the evaluation items used to evaluate students' environmental performance are paper-pencil or oral type. Activity oriented evaluations are almost neglected.

5.3. Recommendations

Based on the findings of the study and the conclusions made, the following recommendations are forwarded.

1. Significant number of objectives that are related to environmental education in the syllabus are not explained in the textbooks. Thus, Oromia Education Bureau Curriculum Development Department

has to treat these objectives in the textbooks during revision of the textbooks.

2. Environmental problems in the region have to be explained in the textbooks and alternate ways of tackling these problems have to be suggested. With this regard, all the materials, particularly social studies materials lack presentations of the problems and relevant solutions. Thus, subject experts in the Regional Education Bureau have to revise these materials in line with the findings of this study so that the materials help students to solve their local environmental problems.
3. Environmental activities are not exhaustively treated in the materials. Therefore, attention has to be given by the Regional Education Bureau to include more activities so that students could learn through practical action that help them for skill development and bring attitudinal change.
4. It is very essential if evaluation for environmental learning outcomes is practical and activity oriented. The Regional Education Bureau Curriculum Department, therefore, has to implement such type of evaluation techniques in the textbooks.
5. From observations and his experience, the researcher understood that the textbooks cannot cover all environmental knowledge. Hence, additional materials that help students to learn environmental education are required. The Regional Education

Bureau, therefore, has to prepare additional materials that support students to learn more about their environment.

6. The Regional Education Bureau has to improve the textbooks in line with the findings of this study and conduct a thorough and comprehensive study on the other aspects of environmental issues that have to be incorporated in the formal curriculum.
7. The researcher feels that there is a gap between the Regional Education Bureau and other Regional Bureaux such as Agricultural Bureau, Disaster Prevention and Preparedness Bureau and Regional Conservation Strategy Office in promoting environmental education. It is, therefore, timely to suggest that the Education Bureau has to make joint effort with such institutions and NGOs in promoting environmental education in schools.

BIBLIOGRAPHY

Amare Asgedom, (1998). ***Content Analysis Methodology and Applications to Curriculum Evaluation***. IER Flambeau 6:1 Journal of Educational Research 6:1 P. 1-12, Addis Ababa University

Astanin L. and Blagosklonov, (1983). ***Conservation of Nature***. Moscow: Progress Publishers

Atreya, B.D (1981). ***Environmental Education in India***. Bulletin of

UNESCO Regional office for Education in Asia and the Pacific, No 22,
June 1981

Axen C, Mulugeta Tesfaye and Mulu Wolde, (1995). ***A Guiding Document on Environmental Education in Ethiopia***. Addis Ababa, Bulletin of Environmental Education, MOE

Best J.W. and Kahn J.V. (1993). ***Research in Education, 7th ed.*** New Delhi: Prentice – Hall of India. Pvt. Ltd.

Borg, W. and Gall, M. (1983). ***Educational Research, An Introduction.*** New York and London: Longman Inc.

Bresler J. (1968). ***Environments of Man.*** London: Addison Wesley Publishing Company

Brown L. (1973). ***Conservation for Survival, Ethiopia's Choice.*** Addis Ababa: Haile Sellessie I University Press

Browne W. (1983). ***Report from Jamaica to the Sub-regional Workshop on Teacher Training on Environmental Education.*** University of the West Indies, 1983, Unpublished

Budd R., Thorp R. and Donohew L. (1967). ***Content Analysis of Communication.*** New York: The Macmillan Company

Cohen L. and Manion L. (1989). ***Research Methods in Education 3rd ed.***
London: Routledg Publishings

Cunninghan W. et.al (1994) ***Environmental Encyclopidia*** London: Gale Research International Ltd.

- Disigner. S. (1990). ***Teaching Creative Thinking Through Environmental Education***. Colombus, Ohio: ERIC Document Reproduction Service
- EEPA (1997). ***Ethiopian Environmental Policy***, Addis Ababa, (Unpublished)
- EMA, (1988). ***National Atlas of Ethiopia***, Addis Ababa; MOE
- Fedorov, E. (1980). ***Man and Nature: The Ecological Crisis and Social Progress***. Moscow: Progress Publishers
- Haile-Yesus Dinka (1996). ***Increasing Population Pressure and Misuse of the Natural Resource Problems of the Highlands of Oromia Region***
A Paper Presented on a Workshop on Environmental Education
Fiche, 1996, (Unpublished)
- Hale M. (1993). ***Ecology in Education***. New York: Cambridge University Press
- Heimlich J.E. (1992). ***Promoting a Concern for the Environment*** Clearing House, Columbus, OHIO: ERIC Document Reproduction Service
- Hines L. (1973). ***Environmental Issues***, New York: WW. Norton and Company Inc.
- Holsti O. (1969). ***Content Analysis for the Social Sciences and Humanities***, Massachusetts; California: Addison Wesley Publishing
- ICDR (1994) ***Basic Science Curriculum Guide, for Grades 5 and 6***, (Unpublished)

Internet, <http://WWW.Nrca.org/neecweb/eesd/eeinjamaica.Htm>

James Hartley (1985), ***Designing Instructional Text, 2nd ed.*** London :
Kogan Page Ltd.

Kevin T. and Lewis A. (1994). ***An Introduction to Global Environmental
Issues.*** London and New York: Routledge Publishing

Kothari C. (1985). ***Research Methodology; Methods and Techniques. 2nd
ed.*** New Delli: Wishwa Prakashan Publishing

Krippendorff K. (1980). ***Content Analysis: An Introduction to Its
Methodology.*** London: Sage Publications

Leabo D. (1972). ***Basic Statistics.*** Bombay, India: D.B. Traporevala Sons
and Co. Private Ltd.

Lee J.M. and Lee D.M. (1960). ***The Child and His Curriculum. 3rd ed.*** New
York: Appleton – Century –Crofts, Inc.

Leu E. (1999) ***Designing Integrated Curriculum Materials for Primary
Education.*** A paper presented on a Workshop for Curriculum Experts,
Textbook Writers and Key Teachers. Debre-Zeit, 1999, (Unpublished)

Levin A. (1977). ***Protecting the Human Environment: Procedures and
Principles for Preventing and Resolving International
Controversies.*** New York: United Nations Institute for Training and
Research

McMillan H. and Schumache S. (1989). **Research in Education; A Conceptual Introduction 2nd ed.** London: Scott Foreman and Company

Melaku Girma (1994). **An Investigation into the Integration of Environmental Education into Social Studies Courses in Some Selected Teacher Training Institutes of Ethiopia,** A Master's Thesis, (Unpublished) Addis Ababa University

MOE (1981). **Geography for Grade Ten, Student Text.** Addis Ababa: EMPDA

_____ (1981) **Geography for Grade Twelve, Student Text.** Addis Ababa: EMPDA

_____ (1992). **The Environmental Education Project in Ethiopia;** Six years of Experiences as a pilot project (Unpublished)

Morgan R.K.(1998), **Environmental Impact Assessment. A Methodological Perspectives.** London: Kluwer Academic Publishers

OEB (1995). **Science Student Text for Grade Five,** (Afan Oromo Version) Addis Ababa: EMPDA.

_____ (1995) **Social Studies Student Text for Grade Five,** (Afan Oromo Version) Addis Ababa: EMPDA.

_____ (1996) **Science Student Text for Grade Six,** (Afan Oromo Version) Addis Ababa: EMPDA.

_____ (1996) **Social Studies Student Text for Grade Six,** (Afan Oromo Version) Addis Ababa: EMPDA.

- Palmer J, Goldstein W, Anthony C (1995). ***Planning Education to Care for the Earth***. IUCN, Gland Switzerland, and Cambridge, UK
- Pausewang S., Fantu Cheru, Briine S. and Eshetu Chole (1990), ***Ethiopia, Rural development Options***, London and New Jersey: Zed Books Ltd.
- Prabhakar, M. (1981). ***Environmental Education in Malaysia***; Bulletin of the Unesco Regional Office for Education in Asia and the Pacific. No 22, June 1981
- Ramsey. J. and Hungerford, H. (1989). ***The Effects of Issues Investigation and Action Training on Environmental Behaviour in Seventh Grade Students***. Journal of Environmental Education, 23:2.
- Renner M. (1997). ***Fighting for Survival: Environmental Decline, Social Conflict and the New Age of Insecurity***. London: Earthscan Publications
- Samuna Rekiso. (1996). ***The Integration of Environmental Education in the Current Curriculum***. A Paper Presented on a Workshop Organized by Oromia Education Bureau. October, 1996, (Unpublished)
- Savage T. and Armstrong D.(1981). ***Effective Teaching in Elementary Social Studies***. New York: Macmillan Publishing Company
- Scottish Education Department. (1984). ***Learning and Teaching: The Environment and the Primary School Curriculum***. Edinburgh: Crown Copyright
- Simon J. (1969). ***Basic Research Methods in Social Science. The Art of***

Imperial Investigation. New York: Random House

Sintayehu Mamo (1996). **Environmental Problems, Causes, Effects and Means of Preserving Natural Resources Base.** A paper presented on a Workshop organized by Oromia Education Bureau, October, 1996, (Unpublished)

Stone P.J, Dunphy D.C, Smith M.S, and Ogilvie D.M, (1966). **The General Inquirer: A Computer Approach to Content Analysis.** London : The M.I.T. Press

Sytnik K.M, Cherednichenk L.S, Sakaev V.G, Lebedinsky Y.P, Voloshin V.V, and Kolybin V.A, (1985). **Living in the environment:** A source book for Environmental Education. Naukora Dumka Publishers

The Ethiopian Herald (1996), **Conservation of Natural Resources;** Editorial; A Daily News Paper Vol. 52 No. 163 Addis Ababa

Trisler E. (1993). **Global Issues and Environmental Education,** Clearing House, Columbus, OHIO: ERIC Document Reproduction Service

UN Climate Change Secretariat, (1999). **The Kyoto Protocol, to the Convention on Climate Change,** Bonn: Germany

UNEP-UNICEF (1990). **Children and the Environment: The State of the Environment 1990,** UNEP: Nairobi Kenya

UNEP (1988). **The Public and the Environment; The State of the Environment, 1988;** Nairobi, Kenya

UNESCO, (1959) **Primary School Textbooks, Preparation, Selection and Use:** International Bureau of Education, Geneva

_____ (1973). **Report of The United Nations Conference on the Human Environment**, Stockholm, June, 1972.

_____ (1978). **Report of The Intergovernmental Conference on Environmental Education held in Tbilisi**, USSR, October 1977. (Unpublished)

UNESCO/UNEP. (1983). **Federal Republic of Germany. Connect:** Environmental Education Newsletter, VIII: 1.

_____ (1988). **International Strategy for Action in the Field of Environmental Education and Training for the 1990s**. UNESCO, Paris.

_____ (1989). **Inter Regional Training Course on Environmental Education for Educational Planners and Administrators**. New Delhi February 13-18/1989 (Unpublished)

_____ (No date). **A Comparative Survey of the Incorporation of Environmental Education into School Curricula**, Series-17, Paris: UNESCO

Yosef Betemariam (1996). **The Role of Environmental Education in Sustainable Development**, A Paper Presented at a Workshop Organized by Oromia Education Bureau, October, 1996, (Unpublished)

White I.D., Mottershead D.N., Harrison. S.J. (1992). **Environmental Systems. An Introductory Text, 2nd ed.** Cherenham. GB: Stanley Thornes Ltd.

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ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES

Coding Sheet I

This coding sheet is designed to determine the availability of environmental elements that are pertinent to the natural environment in a textbook.

General Information

- | | |
|--|--------------------------|
| 1. Subject _____ | 6. Coder |
| 2. Grade _____ | 6.1. Name _____ |
| 3. Total No. of Paragraphs _____ | 6.2. Qualification _____ |
| 4. Unit of Analysis: <i>A paragraph</i> | 6.3. Occupation _____ |
| 5. Date _____ to _____ | 6.4. Experience _____ |

Direction for Coding

Read thoroughly each of the paragraphs in the sampled chapters of the textbook you are coding. Read also the definition given for a category, "***Availability of the elements of the natural environment***" and the unit of analysis that is "***Paragraph***". Then decide whether environmental elements listed in this coding sheet are available in a paragraph or whether a paragraph reflects about the issues of natural environment or not. If a paragraph contains such environmental elements, put a tally mark (/) under the variable "***available***" in this coding sheet.

Note that, the total number of paragraphs refers to the number of paragraphs in chapters to be coded in a textbook.

No.	Environmental Elements	Available	Remark
1.	<p>Vegetation</p> <p>Presenting about natural vegetation. This includes issues related with plants (trees, bushes, shrubs, grasses, ferns etc.) such as reproduction, distribution, uses etc.</p>		
2.	<p>Land: Issues related with land such as uses of land, soil and soil formation, wise use of land, land topography, history, wise and economically using land etc.</p>		
3.	<p>Wildlife: Wildlife and issues related with wildlife. Wildlife includes all animals including higher animals, insects, worms and birds. Issues with wildlife include uses, proper utilisation of wildlife resources, and distribution of wildlife.</p>		
4.	<p>Water: Sources of water, uses, drainage system, sanitation, and any water resource base.</p>		
5.	<p>Air: Uses of air, the phenomena created by air, such as wind and composition of air</p>		
6.	<p>The interaction between the humanity and his natural environment. This is to say that the relationship between man and his natural environment and the effects of man on the natural environment</p>		

Coding Sheet II

This coding sheet is used to investigate the presentation of environmental problems and related solutions in a textbook.

I. General Information

1. Subject _____
2. Grade _____
3. Total No. of Paragraphs _____
4. Unit of Analysis: **A paragraph**
5. Date _____ to _____

II. Direction for Coding

Read carefully all the paragraphs of the sampled chapters in a textbook you are coding. Identify the ***environmental problems*** presented /addressed in a paragraph and put a tally mark (/) under the variable indicated for the problems listed in this coding sheet. If a paragraph addressed/present about environmental problems listed in this coding sheet, put a tally mark under the variable “***presented***”. Identify also whether a solution is suggested or not for a problem indicated. If a solution is indicated in a paragraph put a tally mark under the variable “***solution suggested***”.

No.	Environmental Problems	<i>Presented</i>	<i>Solution Suggested</i>
1.	<i>Deforestation:</i> Clearing of forests or any vegetation by cutting trees, burning forests, bush lands, shrubs and grassland		
2.	<i>Land Degradation:</i> This includes overgrazing and over cultivation of land that produce land degradation - Poor agricultural practices such as ploughing down the sloppy land, burning of soil and any activity that reduces soil/ land fertility.		
3	<i>Erosion:</i> Removal of soil by wind or by water		

4	Desert: Appearance of desert due to land degradation, deforestation, erosion or any effect on the natural environment that could cause desert.		
5	Killing wildlife		
6	Pollution		
	6.1 Pollution of water and sources of water		
	6.2 Air pollution		
7	Overpopulation		

Coding Sheet III

This coding sheet is designed to identify environmental activities suggested in a textbook to teach environmental issues.

II. General Information

1. Subject _____
2. Grade _____
3. Total N^o of paragraphs _____
4. Unit of Analysis: **A paragraph**
5. Date _____ to _____

II. Direction for Coding

Read thoroughly each of the paragraphs in the sampled chapters of a textbook you are coding and identify the activities presented that are pertinent to the natural environment. Then decide which of the activities listed in this coding sheet are addressed and state your response by putting a tally mark (/) under the variable of your choice in this coding sheet.

No.	Activity	Addressed	Undecided	Not addressed
1	Environmental Protection 1.1. Protecting natural vegetation (trees, forests, bushes and shrubs) from destruction			
	1.2 Avoiding killing of wildlife			
	1.3 Protecting water from pollution			
	1.4 Protecting soil erosion			
	1.5 Protecting air from pollution			
2	Conservation 2.1 Planting trees, or Rehabilitation of destroyed natural forests			
	2.2. Wildlife conservation			
	2.3. Conservation of soil and other land			
	2.4. Conservation of water and water resources			

Coding Sheet IV

This coding sheet is designed to investigate the presence of illustrations in a textbook that help to demonstrate about the natural environment.

III. General Information

1. Subject _____
2. Grade _____
3. Total N^o. of illustrations _____
4. Unit of Analysis: ***Illustrations***
5. Date _____ to _____

II. Direction for Coding

Observe each of the illustrations (pictures, maps and photographs) in the textbook carefully including the cover page. Then determine whether that illustration demonstrates any environmental issue/s that are related with the natural environment. Identify such illustrations according to the description that they represent by putting a tally mark (/) under the respective variable (Picture, Map or A Photograph) in this coding sheet. **Note** that one illustration can describe more than one idea/issue. The total No of illustrations refers to the total illustrations in a textbook not in a particular chapter.

<i>Description of Illustrations</i>	<i>Picture/Diagram</i>	<i>Map</i>	<i>Photograph</i>
Demonstrating the natural resources (plants, soil, water, land, soil, air and animals.)			
Protecting natural resources			
Conservation of natural resources			
Destroying natural resources by cutting trees, burning bushes, killing wildlife, polluting water and air, poor utilization of land			

Coding Sheet V

This coding sheet is designed to investigate the type of **evaluation items** used to evaluate environmental education contained in a textbook.

IV. General Information

- | | |
|--|--|
| 1. Subject _____ | 4. Unit of Analysis: <i>Items</i> _____ |
| 2. Grade _____ | |
| 3. Total N ^o . of Items _____ | 5. Date _____ to _____ |

II. Direction for Coding

Read all the items used for evaluation purpose used in all the units of the textbook you are evaluating. Identify the item that is used to evaluate issues related to the natural environment. Then make a tally mark (/) for the type of an item for which it belongs under the variable "frequency" in this coding sheet. **Note** that the total N^o of Items is the total items used for evaluation in sampled chapters.

No	Type of Evaluation	Frequency	Remark
1.	Answer the following (Question) type		
2.	True or False		
3.	Fill in the blanks		
4.	Matching		
5.	Choose the best answer		
6.	Writing Report		
7.	Explain		

8.	Evaluating practical works/projects or activities		
9	Evaluation through discussion		

Appendix-

II

ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES

A Questionnaire to be Filled by the Teachers Teaching Science and Social Studies in Grades 5 and 6

The purpose of this questionnaire is to gather the data with regard to the incorporation of Environmental Education in different subjects. The information you provide is highly valuable and very important for the findings of the study. Your information is confidential and never be exposed or transferred to any other body by any means. You are therefore, kindly requested to answer all the items after reading thoroughly.

Personal Information

Direction: Write in the blank space or indicate your response by putting a (√) mark.

1. Zone _____

2. Woreda _____

3. School _____

4. Sex: Male

Female

5. Qualification

5.1. Grade 12 and below

5.2. TTI Graduate

5.3. Diploma

5.4. Degree

5.5. Other specify _____

6. Grade that you are currently teaching science or social studies
- 6.1. Grade 5
 - 6.2. Grade 6
7. Subjects you are currently teaching
- 7.1. Science
 - 7.2. Social Studies
8. Which of the following teaching materials do you have to teach these subjects?
- 8.1 Syllabus
 - 8.2 Textbook
 - 8.3 Teachers' Guide

Incorporation of Environmental Education

Direction: Read each of the items thoroughly and answer it by writing or putting a mark (√) in the space provided.

9. Your awareness about environmental education
- 9.1 Very high
 - 9.2 High
 - 9.3 Small
 - 9.4 Very Small
 - 9.5 Not at all
10. If your response is very high or high, on which of the following environmental issues do you have awareness? (Your response could be more than one)
- 10.1. Protection of natural resources
 - 10.2. Conservation of natural resources
 - 10.3. Wise use of natural resources

11. Rank the following environmental problems according to their severity. Give 1 for the most severe problem, 2 for the second most severe one etc. (i.e. 1st, 2nd, 3rd, 4th etc.)

- 11.1. Cutting trees _____
- 11.2. Burning bushes and forests _____
- 11.3. Overgrazing _____
- 11.4. Over Cultivation _____
- 11.5. Soil Erosion _____
- 11.6. Killing Wildlife _____
- 11.7. Water Pollution _____
- 11.8. Air Pollution _____
- 11.9. Overpopulation _____
- 11.10. Other Specify _____

12. Among the following environmental problems which are contained in a textbook?

- 12.1. Cutting trees
- 12.2. Burning of forests and bush as
- 12.3. Overgrazing
- 12.4. Over cultivation
- 12.5. Soil erosion
- 12.6. Killing Wildlife
- 12.7. Water Pollution
- 12.8. Air Pollution
- 12.9. Overpopulation
- 12.10. If any Specify _____

13. How Environmental Education appeared in a textbook?

- 13.1. As a single unit
- 13.2. Integrated in different units
- 13.3. Both as a unit and integrated

Rate the following activities/ contents. Give your response by marking (√) in a table under the variable of your choice.

KEY

1. Good
2. Satisfactory (Average)
3. Poor

No	Activities /Contents	1	2	3
14	The textbook is helping to teach environmental education.			
15	Environmental problems pertinent to natural environment are contained in a textbook.			
16	The textbook provides means of tackling environmental problems.			
17	Teaching methods suggested in the teaching materials are appropriate to teach environmental education.			
18	Contents of Environmental Education are incorporated in a textbook.			
19	There are activities in textbooks that are helping to teach environmental education.			
20	There are illustrations in a textbook that are helping to express the natural environment.			
21	There are evaluation items in textbooks that are helping to evaluate environmental learning outcomes.			

22. If you response on item for item No – 14 is “good” which of the following are contained in a textbook?

22.1 Protecting natural resources

22.2 Conservation of natural resources

22.3 Wise use of natural resources

23. Which of the following approach do you suggest to teach Environmental Education in schools?

23.1 As a single subject

23.2 As a unit in different subjects

23.3 Integrating in all units of different subjects

Rank the following teaching methods according to their appropriateness to teach environmental education. Give 1 for the most appropriate, 2 for the second most appropriate method etc.

23.4 Lecture _____

23.5 Demonstration _____

23.6 Field observation _____

23.7 Project work _____

23.8 Discussion _____

23.9 Practical Work _____

23.10 Experiment _____

23.11 Inviting Guests _____

23.12 Debating _____

23.13 Film _____

23.14 If any specify _____

24. Which of the following teaching methods do you used to evaluate your students about their environmental learning performance?

24.1 Oral question

24.2 Written question

24.3 True or false

24.4 Matching

- 24.5 Choose the best
- 24.6 Writing report
- 24.7 Explain
- 24.8 Evaluating practical or project work
- 24.9 If any specify _____
25. Write ways /means of tackling environmental problems that are related with the natural environment
- 25.1 _____
- 25.2 _____
- 25.3 _____
- 25.4 _____
- 25.5 _____
- 25.6 _____

Appendix-
III

**YUUNIIVARSIITII FINFINNEETTI
DAMEE BARNOOTA DIGIRII LAMMAFFAA**

**Gaafannoo Barsiisota Barnoottan Saayinsii fi Hawaasaa Kutaa 5 fi 6
Barsiisaa Jiraniif Dhihaate**

Gaafannoon kun qo'annoo qabata ***barnootni naannoo***(*environmental education*) barnoottan biroo keessatti qabu ilaalchisee godhamuuf odeeffannoo sassaabuuf kan qophaa'eedha. Deebiin isin kennitan bu'aa qorannichaaf bu'uura waan ta'eef haalaan xiinxaluun akka deebii itti kennitan kabajaan gaafatamtu. Yaadni isin kennitan karaa kamiinuu nama biraatiif darbee akka hin kennamne isiniif mirkaneessaa guuttanii deebisuu keessaniif ***dursinee isin galatoomfanna.***

9.3 Xinnaa

9.4 Baay'ee xinnaa

9.5 Hin qabu

10. Deebiin keessan baay'ee yookiin hamma murtaa'e kan jedhu yoo ta'e, dhimmoota barnoota naannoo armaan gaditti tarreeffaman keessaa isa kami irratti hubannoo qabdu? (Deebiin keessan tokkoo ol ta'uu danda'a)

10.1. Qabeenya uumamaa eeguu

10.2. Qabeenya uumamaa kunuunsuu

10.3. Qabeenya uumamaatti seeraan fayyadamuu

11. Rakkoolee naannoo uumamaa armaan gaditti tarreeffaman akkaataa hammeenya isaaniitiin sadarkaa kennaafii, (rakkoo baay'ee cimaa ta'eef **1**, kan itti aanee cimaa ta'ee **2** fi akkas jechaa itti fufaa, jechuunis 1^{ffaa}, 2^{ffaa}, 3^{ffaa}, 4^{ffaa}, 5^{ffaa},)

11.1. Mukkiin ciruu _____

11.2. Bosonaa fi marga gubuu _____

11.3. Lafa akka malee qorqisiisuu _____

11.4. Lafa akka malee qotuu _____

11.5. Harama biyyee _____

11.6. Bineensota bosonaa ajjeessuu _____

11.7. Faalama bishaanii _____

11.8. Faalama qilleensaa _____

11.9. Baay'ina Ummataa _____

11.10. Kan biraa yoo jiraate _____

12. Rakkoolee naannoo uumamaa armaan gaditti tarrefaman keessaa isaan kamitu kitaaba barataa keessatti ibsamani jiru? (Isaan biroos yoo jiraatan barreessaa)

12.1. Mukkiin ciruu

12.2. Bosonaa fi marga gubuu

12.3. Lafa akka malee Qorqisiisuu

12.4. Lafa akka malee qotuu

12.5. Harama biyyee

- 12.6. Bineensota bosonaa ajjeessuu
 12.7. Faalama Bishaanii
 12.8. Faalama Qilleensaa
 12.9. Baay'ina Ummataa
 12.10. Kan biroo yoo jiraate _____

13. Waa'een barnoota naannoo kitaaba barataa keessatti akkamitti dhihaatee jira?

- 13.1. Akka boqonnaa tokkootti
 13.2. Boqonnaawwan adda addaa keessatti qabatamuun
 13.3. Lamaanuu

Gaaffilee armaan gadii sadarkaa kennuufiin madaalaa. Qabxii kennitan gabatee keessatti mallattoo (✓) gochuun agarsiisaa.

Ibsa

1. Gaarii
2. Giddugaleessa
3. Xiqqaa

Lakk	Gaaffi/Ibsa	1	2	3
14	Kitaabni barataa barnoota naannoo barsiisuuf gargaaruu isaa			
15	Rakkoleen qabeenya umamaa calaqqisan kitaaba barataa keessatti dhihaatuu isaanii			
16	Kitaabni barataa akkaataa rakoollee naannoo uumamaa itti furuun danda'amu irratti maloota adda addaa dhiheessuu isaa			

17	Malootni baruu-barsiisuu kitaaba keessatti caqasaman waa'ee naannoo uumamaa barsiisuuf gargaaruu isaanii			
18	Kitaabni barataa waa'ee naannoo uumamaa barsiisuu irratti haala qabatamaa naannoo wajjin walqabatuu isaa			
19	Gochootni (activities) kitaaba barataa keessa jiran waa'ee naannoo uumamaa barsiisuuf gargaaruu isaanii			
20	Fakkiiwwan kitaaba barataa keessa jiran waa'ee naannoo uumamaa ibsuu isaanii			
21	Gilgaalotni kitaaba barataa keessa jiran barnoota naannoo madaaluu isaanii			

22 Deebiin isin lakk-14 irratti kennitan “Gaarii” kan jedhu yoo ta’e kanniin armaan gadii keessaa kam fa’atu qabatamee jira?

22.1 Qabeenya uumamaa eeguu

22.2 Qabeenya uumamaa kunuunsuu

22.3 Qabeenya uumamaatti haalaan fayyadamuu

23 Barnoota naannoo manniin barnootaa keessatti kennuuf haala kamiin osoo dhihaatee wayya jettu?

23.1 Akka barnoota tokkootti

23.2 Barnoottan biroo keessatti boqonnaa of danda'e ta'ee

23.3 Boqonnaa adda addaa keessatti qindaa'ee

24 Barnoota naannoo barsiisuuf maloota ni gargaaru jettan sadarkaa kennaafii (1^{ffaa}, 2^{ffaa}, 3^{ffaa}, 4^{ffaa}, 5^{ffaa} ... jechuun itti fufaa.)

24.1 Ibsa _____

24.2 Agarsiisa _____

24.3 Doowwii dirree _____

24.4 Piroojektii _____

- 24.5 Marii _____
- 24.6 Hojiin agarsiisuu_____
- 24.7 Yalii _____
- 24.8 Keessummaa affeeruu _____
- 24.9 Falmii _____
- 24.10 Fiilmii agarsiisuu _____
- 24.11 Kan biroo yoo jiraate _____

25 Maloota madaallii armaan gaditti tarreeffaman keessaa barnoota naannoo madaaluuf isaan kamitti fayyadamitu?

- 25.1 Gaaffii afanii
- 25.2 Gaaffii barreeffamaa
- 25.3 Dhugaa ykn Soba
- 25.4 Walitti Firoomisi
- 25.5 Filannon deebisi
- 25.6 Gabaasa barressi
- 25.7 Ibsa kenni
- 25.8 Gocha ykn Piroojektii madaaluu
- 25.9 Kan biroo yoo jiraate _____

26 Rakkoolee naannoo uumamaatiin walqabtan furuuf malota ni gargaaru jettan barreessaa

- 26.1 _____
- 26.2 _____
- 26.3 _____
- 26.4 _____
- 26.5 _____
- 26.6 _____

Appendix-

IV

ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES

Questions Used for Focus- group Discussion

1. How do you describe your natural environment?
2. Is there any change on the natural environment over time that you feel? If yes what changes?
3. What are the major environmental problems in your locality?
4. What are the causes of these problems?
5. What is/are your suggestion/s to solve these problems?
6. How do you feel more comfortable to learn environmental education in schools?
 - As a single subject or
 - Integrated in different subjects
 - Why?

ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES

Classroom observation checklist for the presentation of environmental issues during the classes of science and social studies

I General Information

1. School name _____
2. Grade _____
3. Subject _____
4. Date of observation _____
5. Topic of the day _____

II Presentation of Environmental Issues During Class Session

NO	Issues/Activities	Presentation in the Classroom	
		Yes	No
1	Environmental issues addressed in the days lesson		
	1.1 Protection of natural environment		
	1.2 Conservation of natural environment		

	1.3 Wisely use of natural resources		
2	The topic is helping to demonstrate environmental problems		
3	Students are actively participated in the teaching-learning of environmental issues during the day lesson		
4	Environmental problems presented during the lesson		
	4.1 Cutting trees		
	4.2 Burning bushes, grasses, shrubs, forests etc.		
	4.3 Over cultivation of land		
	4.4 Overgrazing		
	4.5 Poor agricultural practices		
	4.6 Soil erosion		
	4.7 Killing wildlife		
	4.8 Water pollution		
	4.9 Air pollution		
	4.10 Overpopulation		
5	Solutions to the environmental problems taught in the classroom were indicated during the lesson		
7	The topic was presented by integrating or relating with the learners immediate environment		
8	Practical activities pertinent to environmental issues were performed by the students during		

	the lesson		
9	The method employed was participatory and student encouraging		
10	Different evaluation techniques were used to evaluate the topic of the day		

Appendix- VI

ADDIS ABABA UNIVERSITY

SCHOOL OF GRADUATE STUDIES

SAMPLE AREAS FOR DATA COLLECTION

ZONE	WOREDA	SCHOOL
1. Bale	1. Adaba	1. Lelliso
		2. Washa
		3. Furna
	2. Dodola	1. Berisa
		2. Heraro
		3. Dodola No-2
2. Borena	1. Galana Abeya	1. Birbirsa

		2.Iddo Miqe
		3. Tore
		2. Hagere-maariam
		1.Garba
		2. Abayi
3. Shewa East	1. Adami Tulu	1. Boremo
		2. Adami Tulu
		3. Batu G/G
	2. Arsi Negelle	1. Arsi Negelle No-2
		2. Kersa
		3. Dole
4. Shewa North	1. Degem	1. Genda-Sheno
		2. Muka Qule
		3 Degem
	2. Girar Jarso	1. Abiyot-Fire
		2. Chagel
		3. Abdisa Aga

Appendix- VII

Guiding principles developed and endorsed by the Tbilisi conference

The Tbilisi conference developed and endorsed the following guiding principles.

Environmental education should:

- ◆ consider the environment in its totality - natural and built, technological and social (economic, political, cultural-historical, moral, ethical)
- ◆ be a continuous lifelong 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 into environmental conditions in other geographical areas.
- ◆ focus on current and potential environmental situations, while taking into account the historical perspectives
- ◆ promote the value and necessity of local, national and international co-operation 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 value 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.
- ◆ emphasise the complexity of environmental problems and thus the need to develop critical thinking and problem-solving skills.

Appendix VIII

Objective Related to Environmental Education in Grades

5 and 6 Science and Social Studies

Grade – 5 Science

At the end of the lesson the students should be able to keep themselves and their environment in good hygienic conditions.

- Control the reproduction of some of the harmful insects in their locality.
- Keep bees for producing honey at their homes or schools.

- Explain how fishes reproduce.
- Keep fishes in aquarium or artificial pond at their school
- Explain the life cycle of amphibian
- Explain the life cycle of reptiles
- Explain reproduction of birds by taking hen as an example.
- Apply modern poultry farming techniques at their homes or schools
- Identify and list the parts of a flower
- Explain the functions of the parts of a flower.
- Realise the importance of pollination, self-pollination and cross-pollination.
- Describe self pollination and cross pollination
- List the agents of pollination and explain how they help in pollination.
- Explain fertilisation in plants.
- Distinguish between fruits and seed.
- Explain what vegetative reproduction is and its advantages and disadvantages.
- Explain the difference between cutting, layering and grafting
- Give examples of plants that reproduce by cutting, layering and grafting.
- Apply vegetative reproduction practically.
- Explain the importance of plants as sources of food for human beings and animals.
- List the different parts of plants used for food.
- Tell some uses of plant fibbers.
- Explain the uses of some plants as medicines and drugs.
- Define material resource.
- Define conservation.
- Explain the methods of conservation of soil.
- Practice the methods of soil conservation
- Explain the methods of water conservation.
- Participate in practices of water conservation and sanitation.
- Describe the water cycle.
- Explain the importance of forests.

- Mention some Ethiopian forests
- Explain the methods of conservation of forests.
- Describe the effects of deforestation.
- Participate in reforestation programmes
- Define wildlife.
- List names of examples of wildlife.
- Explain the importance of wildlife.
- Explain the methods of wild life conservation

Grade- 6 Science

- Identify and specify current environmental problems of their locality.

- Single out over population as serious problem because it outstrips ability to cope with demands like clean water, food, etc.
- State problems of soil, forest and water as well as the interrelationships of the three
- Describe problems of pollution and sanitation in their community.
- Clarify their environmental related values.
- Explain the role of science and technology in solving environmental problems.
- Stress the need for broad-based participation to solve problems.
- Define diseases.
- Compare communicable diseases and non-communicable diseases explain causes of diseases.
- Describe the symptoms of diseases.
- Explain how diseases can be spread through air and give examples
- Apply methods of prevention of water borne diseases.
- Describe the methods of keeping water clean and the role of personal hygiene and environmental sanitation to clean water.
- Explain how contaminated food can cause diseases.
- Describe the methods of protecting food from contamination

- List some methods of food preservation.
- Name the members of our solar system.
- Compare and contrast human reproduction with the reproduction of some other common mammals.
- Classify plants into their four major groups.
- Identify algae and fungi as primitive plant.
- Identify mosses and liverworts.
- Identify ferns.
- Compare flowering plants and non-flowering plants.
- Explain the structures and functions of a seed.
- Describe the factors needed for germination and elaborate the process of germination.
- Perform an experiment on germination.
- List examples of parts of plants used as food for human beings.
- Explain the importance of plants for food and for health.

Social Studies Grade – 5

- Show the highlands of Africa on the map.
- Describe the gorges and planes of Africa from the map.
- Show the great valleys of Africa on a map.
- Explain the main rivers, drainage and swampy areas of Africa using a map.
- Explain uses of rivers.
- Describe types of African lakes their locations and uses.
- Describe the climate of Africa using a map.
- Show the climate and distribution of plants and animals lived in respective climate on a map.
- Explain how desertification is spread in East Africa and the related problem.
- Discuss water resource in East Africa.
- Explain how water resource management is improved in Africa.

- Explain the agricultural systems in African.
- List types of agriculture and different agricultural products in Africa.
- Describe natural and man-made problems caused shortage of food in Eastern Africa.
- Describe the main minerals in Africa and their distribution

Social Studies Grade – 6

- Describe the shape of earth and its movements.
- Explain the effects of the movements of the earth.
- Explain the main topographic features of the earth.
- List the main uses of rivers and lakes.
- Show the worlds' weather and its distribution on a map.
- Identify the main groups of plants and animals in the world and explain their uses.
- Describe causes of climatic disturbances and its effects.

Appendix- IX

