INTEGRATION OF ENVIRONMENTAL EDUCATION INTO ADULT NON-FORMAL EDUCATION: THE CASE OF PROGRAMS RUN BY AGRI-SERVICE ETHIOPIA IN EAST GOJJAM

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ACRONYMS

ANFE - Adult Non-Formal Education.

ANFEAE - Adult and Non Formal Education Association in Ethiopia

ASE - Agri-Service Ethiopia.

COLF - Community Learning Forum.

EE - Environmental Education.

EEPP - Environmental Education and Training Partnership.

EPA - Environment Protection Authority.

FAO - Food and Agricultural Organization.

FDRE - Federal Democratic Republic of Ethiopia.

FTC - Farmer Training Center.

IKS - Indigenous Knowledge System.

IUCH - International Union for the Conservation of Nature and Natural Resources.

MOE - Ministry of Education.

NAAEE - North America Association for Environmental Education.

NGO - Non-Governmental Organization.

PRA - Participatory Rural Appraisal.

UNDESD - United Nations Decade for Education for sustainable Development.

UNEP - United Nations Environment Program.

UNESCO - United Nation Educational, Scientific and Cultural Organizations.

UNHCR - United Nation Higher Commission for Refugees.

UNICEF - United Nation International for Cultural and Educational Fund.

WCED - World Commission for Education and Development.

ABSTRACTS

The purpose of this study was to assess the integration of environmental education into Adult Non-Formal education run by Agri-service Ethiopian in East Gojjam Zone. The sources of the data were trainees, facilitators, program officers (at office level of ASE) and program director (at head office) and Zone Agriculture and Rural Development Department experts. Curricula materials and catchments areas of that specific program were used as sources of data. Random sampling technique was employed to select training centers, trainees, facilitators and catchments areas. The program director, officers and experts were selected purposefully. Questionnaires, interviews, observation and focus group discussion were used as instrument for data collection together with document analysis. The data were analyzed both quantitatively and qualitatively. In quantitative analysis percentage, mean and standard deviation, chi-square, ANOVA test and inter correlation matrix were employed. Data from interviews, observation and focus group discussion were qualitatively analyzed and synchronized with the rest data according to their relevance. The findings of the study then revealed that the attitude of the trainees towards their environment was found not to be so heartening, i.e. 76.62% of the sample trainees were found having unfavorable environmental attitude. The result also showed some problems in action skill of the trainees. On the contrary the environmental knowledge of the trainees was found promising (75% 0f them passed the test). Despite the positive integration of cognitive domains in curricula materials, affective and psychomotor domains were found neglected. The linear relationship that was expected to exist between knowledge, attitude and skill of the learners was not maintained (with 0 .098 correlation). The research also revealed that performance in environmental issues in terms of sex and age was different. Male trainees were found more knowledgeable than females but less concerned about their environment. But the knowledge difference between sample trainees of different age groups was not statistically significant. Regarding attitude, females and older trainees were found to be more concerned than males and younger ones. In addition to this, skill difference was manifested among different training centers. Finally, the relationship between stakeholders in integration of environmental issues into adult training program was found very weak. The inclusion of environmental education elements into curricula materials was recommended. The positive relationship among stakeholders should also be given due consideration.

CHAPTER ONE

1. INTRODUCTION

1.1. Background of the Study

Studies reveal that people in this world have been deteriorating the planet Earth very rapidly due to their immediate interaction with the environment for their economic, social and political needs in the twenty first century. This interaction mainly results in serious local, national and global environmental problems like soil erosion, deforestation, desertification, flood, drought and poverty, global warming, air pollution and ozone layer depletion. The local environmental problems are the outcomes of a mismatch of local environmental conditions and the human efforts to generate resources from the environment such as hunting wild animals for food, cutting trees for lumber, farmland and fuel wood and so forth, while global environmental problems are the results of the cumulative effects of the local ones (Ranjan, 1999; Ermias, 2003; Desalegn, 2003; Beletu and yosef, 1990 and UNESCO-UNEP, 2000).

Globally, according to World Commission for Environment and Development (WCED, 1987), the planet Earth and its people are at the time of a matter of life and death because of the "failures of 'development' and failures in the 'management of our human environment' "(p.2). The failures of the former result in having more people: who are hungry; who cannot read and write; who cannot get safe water; who cannot have safe homes; and who face shortage of fuel wood for cooking and warming themselves. On the other hand, the failures of the latter result in global warming, deforestation, ozone depletion, acid rain (UNEP, 2006; Kemp, 1990; WCED, 1987). Specifically, global warming is now the most threatening environmental problem in the world. As a result, it is one of the top sensitive agendas that need immediate solutions from people of the world.

According to Banton (2005) in Atilabachew (2007), Poor resource and environmental management causes not only global environmental problems but also continental ones. As to Baton, Africa, for instance, as a continent has been facing different serious environmental problems like Population explosion, poverty, deforestation, desertification, soil erosion and health problems. For example, it experienced widespread food shortage, 22,000,000 people in

central Africa and 10,000,000 in Ethiopia alone in 2005. Similarly, UNEP (2006) stated that the state of environmental crises becomes severe in the North, Central and Eastern part of Ethiopia. More specifically the highlands of Ethiopia occupy approximately 45 percent of the country's total land area, and house over 85 percent of the population and 75 percent of livestock. Yet these crucial lands are among the most severely eroded areas in the world. Advanced deforestation and land degradation under increasing demographic pressure are the major causes. "Some 50 percent of the land area is significantly eroded, 25 percent seriously eroded and five percent has lost the ability to produce" (p.12).

As to Damtew (2007), the community should have the right knowledge, skills, and values plus positive attitudes to their environment so that they consume, preserve and protect it and this will help not only to lead quality life for them but also to handle it down from generation to generation. Moreover, research findings have shown the status of environmental education in developing countries including Ethiopia. For instance, UNESCO-UNEP(2000) claimed that "trend in environmental education in the school curriculum, particularly in developing countries is confronted with the problem of having to deal with the curriculum area which is relatively new and not well defined"(p.122).

To overcome these environmental problems and to bring sustainable development, among other policy measures, one of the most important solutions is integrating Environmental Education in to Adult Education programs since adults take the lion share in deteriorating the environment. Integration can be conducted either into different subjects (multidisciplinary) or integrating different subjects so that they make environmental education (interdisciplinary) at different levels of education system.

The integration of environmental education is vital not only for formal education but also for all education systems. According to FDRE (1994), the New Education and Training Policy of Ethiopia was developed to solve the problems of our education such as access, equality, quality and relevance; and to solve problems that the objectives and contents of the education were not related with the needs of the society; the mode of presentation did not develop the students problem solving ability and attitude. To solve these problems and make our education relevant to the need of the society some of the policy statements address that "education has to be integrated

with practice, research and development to contribute towards and all-rounded development of the society (p.2). Axen, Mulugeta and Mulu (1995) quoted similar statements from the policy and underlined that "...environmental education is made an integral part of the teaching and learning processes in the country as a whole" (p.11). In the same way Bishop (1989) underlined that ".....any education system must be seen as an integrated whole and if one of its parts is modified the whole system will feel the repercussions and be affected"(p.102).

Following New Education and Training Policy of Ethiopia, the rationale of Adult Education Strategy MOE (2006) states adult education "...can provide flexibility and skills to facilitate diversification of agricultural and off-farm income sources to reduce the impact of drought and increase the range of crops that can be grown "(p.iv).

According to MOE (2006) statistics, there were great diversities in number of adult learners among different religions. This is partly because some of difference in population and partly because some regions are doing more than others, some of them in collaboration with NGOs (p.iv). As it is explicitly stated in the strategy, the overall objective of the National Adult Education Strategy is the development of a well planned, organized and coordinated adult education system that will provide opportunity for youth and adults to have access to relevant quality learning programs to enable them participate effectively in the economic, socio-cultural and political development of Ethiopia.

The links between Physical environment and current social and political problem are becoming more evident that the integration of environmental education in to adult education programs is assuming an important social function. In the organization and teaching of adult non-formal education, NGOs have a salient role in promoting these programs towards sustainable development. Agri-service Ethiopia (ASE) as one of the indigenous non-governmental organization, established in December 1969 (ASE, 2007),
has been conducting its programs on conservation of natural resource, rural water supply and community health programs since its establishement.ASE has organized and structured training issues in to two categorized groups: general awareness training and skill enhancement training. In East Gojjam, which is the area of study, Adult Training Program is now being carried out as

COLF (Community Learning Forum) for about a year every year. The process of adult non formal training from the conception of curricula development to its establishment in its strategic plan as:

> *In the strategic period, the program formulation, implementation and monitoring and evaluation were done using participatory rural appraisal (PRA) tools to create an enabling environment for the participation of those who have a stake in all these. Therefore, community participation was enhanced, attempts were made to address the needy community group; indigenous knowledge and practices were encouraged, and inputs were supplied and demonstrated (ASE, 2007:3).*

But, there are still cloudy of observations that adult learners are not in a position to protect their environment.

Hence, it is the call of the day to conduct integrated learning across disciplines, problem solving, decision making, independent and group learning , and issue- based situational activities as the hallmarks of environment – based education (NAAEE, 2001 in Damtew,2007).

1. 2 Statement of the problems

Different scholars have witnessed that massive population pressure and lack of alternatives are fast shrinking Ethiopia's limited forest resources. For instance, Beletu and Yosef(1990) witnessed that in Ethiopia, environmental problems are increasing at an alarming rate. Deforestation of Ethiopia's limited and quickly dwindling wood resources and pollution caused by industrial and domestic wastes are the major problems (UNICEF, 2007). This is because the degrees of land degradation, deforestation, over cultivation and over grazing due to intensive agriculture and early settlement. Hurni (1987) in Atlabachew (2007) notifies that:

> *About half of the high lands (270,000km^2) are already eroded, of this; 140,000km2 are seriously eroded and have been left with relatively shallow soils. Estimates from pilot level studies have also shown that the rate of soil loss is high from currently unproductive (70t/h^2) and cultivated areas 42t/h^2.*

The loss of agricultural value between 2000 and 2010 will be $ 7 billion without considering the indirect impact of land degradation in Ethiopia (Berry, 2003). He also mentioned that " Forests in general have shrunk from covering 65% of the country and 90% of the highlands to 2.2% and 5.6% respectively (p.4). Haile (2004), also discussed that about 20,000-30,000

hectares of croplands in the high lands are being abandoned annually since cropping can no longer be supported by the soil. It is also projected that "land degradation at the present rates would destroy the farmlands of some 10 million high land farmers by 2010" p.45.

In addition to this, the present researcher has a long experience, as he worked for about four years in the same field, that there is a big challenge to change the widespread belief that what happens to the environment is not caused by our own actions, but by some one somewhere else. Yet adult educators including NGOS are aware of the fact that although community action is a powerful pool there are clear limits to what can be achieved at this level especially when local political and social conditions are taken in to account.

Another challenge in this regard is that in poor and marginalized communities, environmental education is often regarded as luxury. In view of the present unemployment situations, solutions which aim at transforming the economy towards more ecologically sound patterns of production and consumption, often clashes with policies with short term economic growth. As to Lind and Johnson (1999), environmental education often suffers from this mistaken conflict between economic growth and sustainable development at times when economic needs are priority and it seems absurd to propose the integration of environmental education in to education programs.

Unlike the case before, the present curriculum has given attention to environmental issues. The need to integrate environmental issues is well stated in the general and specific objectives of the Education and Training Policy of Ethiopia (MOE, 1994) and in turn, the curricula at deferent levels are expected to embrace the issues.

Even though Damtew(2007) and Melaku(1994) tried to study the integration of environmental education in relation to some selected subjects ,the present researcher fails to get any pertinent research done concerning integration of environmental education into adult education in multidisciplinary model with its objectives, contents, teaching methods and evaluation techniques. Lack of available relevant researches and intensification of environmental problems are the driving forces which boost the position of the present researcher to conduct this study.

Hence, the integration of environmental education not only into formal education but also into adult non-formal education should be assessed from the point of view of ecologically sustainable development. The focus of this study is, therefore, assessing whether environmental education (EE) is integrated into Adult-Non-Formal Education programs run by Agri-Service Ethiopia in East Gojjam zone, Amhara Regional State.

1.3 Objectives of the Study

In order to assessing integration of environmental education into the Adult-Non-Formal Education programs run by Agri-Service Ethiopia at East Gojjam zone, the following objectives have been pursued:

- To identify whether the general and specific objectives and contents developed by Agri-Service Ethiopia for adult learners, integrate environmental education.
- To identify modifications required in the teaching materials to ensure inclusion of environmental education components: objectives, contents, teaching methodologies and evaluation techniques.
- To see the level of environmental competence of the trainees in relation to knowledge, attitude and acquisition of skills.
- To see the linear relationship among knowledge, attitude and skill.

To achieve these objectives, the following basic research questions were raised.

1. How environmental education objectives and contents were addressed in teaching and learning materials of Adult - Non-Formal Education?
2. How environmental education methodologies and evaluation techniques had been integrated into the curricula materials?
3. What was the level of environmental competence of the trainees in relation to knowledge, attitude and acquisition of skills?
4. Was there any relationship between the trainees' environmental knowledge, attitudes, and skills?

1.4 Significance of the Study

Since environmental education is a local, regional, and global concern to alleviate environmental problems in their real contexts towards sustainable development, its relevance to developing countries like Ethiopia is unquestionable. As this study is concerned with the assessment of the integration of environmental themes into Adult Education Programs run by Agri-Service Ethiopia, this paper may help

- MOE, to propose ideas to NGOs in general and Agri-Service in particular concerning environmental education for adult non-formal learners;
- Agri-Service to assess the gap between its curricula documents and actual practices, and synthesis its efforts to integrate environmental education in different teaching materials;
- Curriculum designers to see the weaknesses, of integrating environmental issues into adult education and to improve in the forthcoming editions; and
- Community educators or facilitators in Agri-Service to see their weaknesses, of implementing these materials in relation to environmental education objectives , contents , teaching methods and evaluation techniques to develop learners' knowledge, skills and attitudes as whole towards sustainable development

1.5 Delimitation

An assessment of the integration of environmental education into Adult -Non-Formal Education includes several aspects such as objectives, relevant contents, teaching methods, evaluation techniques and other curricular issues related to environmental education. Therefore, this study has focused on assessing the integration of environmental education objectives, contents, teaching methods, and evaluation techniques into adult education programs run by Agri-Service

Furthermore, this study inline with its purpose has focused on the components acquired by trainees, which take the form of knowledge, attitude and skill. The study has also covered five of the seven training centers in East Gijjam zone, which is run by Agri-Service Ethiopia. The rationale that Agri Service –Ethiopia is chosen for intended objectives is that because it has

relatively administered better structured Ault-Non Formal Education Programs, so that investigating the integration of environmental issues into adult –non formal program would not be premature.

1.6 Limitation of the study

The nature of the study has limited the time of data gathering to be at the end of training program of Agri-Service, as the training period is from every March(beginning time) to January(ending time). As a result, the researcher had very limited time to prepare data gathering instruments as early as possible and collect data from sample trainees too.

Therefore, it was within these limitations, that the researcher tried to conduct the study. The shortage of materials regarding environment and adult non formal education, especially on Ethiopia was the other challenge. Nevertheless, every effort has been exerted to keep the quality of the study.

1.7. Operational Definitions

Environment: viewed in its totality which comprises the whole set of natural and man-made or socio-cultural systems in which man and other organisms live and interact.

Environmental Education: the awareness of environmental issues, feelings or concern for the environment and the study of the relationships and interactions between dynamic natural and human systems

Ecologically Sustainable Development: development which aims to meet the needs of the society today, while conserving ecosystem for the benefit of future generations.

Integration: the process of including environmental education objectives, contents, teaching methods and evaluation techniques into Adult - Non-Formal education objectives, contents, teaching methods and evaluation techniques in actual teaching learning process either in interdisciplinary or multidisciplinary way

Thinking skill: is ones ability to analyze, synthesize and evaluate the environmental problems, ideas, events etc he or she encounters.

Action skill: is ones ability to operate, calibrate, act etc to the environment to lead his or her daily life.

Integration in multidisciplinary way: is the process of integrating environmental issues in all subjects whenever the contents are relevant.

Integrating in interdisciplinary way: is the process of integrating environmental issues as a separate subject

Catchment area: is the area drained by a river or a body of water where integrated water shade management is taking place by Agri-Service Ethiopia.

CHAPTER TWO

2. LITERATURE REVIEW

2.1. Environmental Problems

Human actions are changing the world we live in. In every corner of the glob today, there is evidence that our environment is changing in ways that affect the people (Kolbert, 2006). Over the past forty years environmental scientists, international governing bodies, citizens and action groups have given concrete examples of these fundamental changes in the earth's climate, oceans, land area, flora and fauna, forests and ozone, which the greater majority link to human causes (Rosenthal, 2006).

Nowadays environmental problems are serious at global, Africa and Ethiopian contexts although they might vary in kind and intensity from place to place. This is because people caused immense environmental changes in hunting for survival and development (UNEP, 1988 in Dessalegn, 1998).

"It is difficult to find landscapes anywhere that are completely natural. Most landscapes through out the world have been altered to a lesser or greater extent, through human activities. Most landscapes are therefore cultural or secondary, sometimes called anthropogenic, technogenic where technological impacts are high" (MOE, 1990:1991-192 in Asmare, 2007:13).

According to the world Commission for Environment and Development (WCED, 1987), the earth and its people are at the time of life and death because of the "failures of development" and failures in the management of our human environment (p. 2).

These failures: failures of development and failures of environmental management result in having more people who are hungry, who are illiterate, who can not get safe water and do not have safe homes, and who face shortage of wood fuel for cooking and warming themselves. These also cause a global warming, deforestation, ozone depletion and acid rain (UNEP, 2006; Kemp, 1990; WCED, 1987).

In Ethiopia, environmental problems are becoming more and more intensified as time passed. According to Ermias (2003), Desalegn (2003), Girma (1994), Aklilu (2001), Gebeyehu et al (1992) and Beletu and Yosef (1990), the increase in degrees of deforestation, degradation, over grazing etc due to intensive domestic agriculture and early settlement aggravate environmental problems. As to Konemund (2002) deformation in Ethiopian is very high, forests are cleared for fuel wood, livestock grazing and house construction. On top of these the expansion of rain fed agriculture causes a deformation which is estimated to be 80,000 to 200,000 hectares per annum (Aklilu, 2001:6).

Not only rural environmental problems but also urban ones such as solid wastes, liquid effluents and air pollutions, resource depletion and deterioration of water and soil quality affect people's quality of life (Eckholm, 1992).

In sum, environmental problems have been accelerated at rapid rate at Global, Africa and Ethiopian context in this century. Hence, unlike the previous era, education has been given key and central role to overcome these problems and to bring sustainable development (Sergeldin, et al., 1998).

As it is stated in Environmental Policy of Ethiopia (EPA, 1997), renewable natural resources are deteriorating at a low level of productivity. Annual expansion of deforestation is estimated to bring about a loss of 40,000 tones of crop production due to soil erosion. As the preamble of the policy reveals, 17% of the potential of agricultural GDP and 25% of potential of forest GDP due to forest depletion were lost in 1990.

Hence environmental problems – either caused by natural catastrophes like drought, famine, flood, hurricane, earth quake, volcanic eruption; or caused by human interference like pollution, waste disposal, deforestation, global warming, unemployment, conflict, desertification etc are very serious problems at global and Ethiopian context which needs to be reversed .Environmental education is one of the most important instruments for correcting the damage that has been done to the natural environment and for reversing, or at least to retard the deterioration of the environment .

2.2. Environmental Education

The new term "Environmental Education" is really not a new concern for the environment as far as environmental issues are considered; rather much has been said about it. Some pertinent literatures are reviewed as follows.

2.2.1. Historical Background of Environmental Education

Alarm about the state of environment was first raised by ecologists in the technologically advanced nations of the world. In Aklilu (2006) and Eckholm (1992) the intergovernmental conferences, of Nevada (1970), Stockholm (1972), Tbilisi (1977), UK (1989) and Rio de Janeiro (1992) were discussed as crucial land Marks for the development of environmental education.

According to Aklilu (2006) and Eckholm (1992), the 1970 Nevada of USA conference is known as the first event to define environmental education in general and the goal of environmental education in particular, and the London Education Forum (1989) was specific to deliver environmental education across Greater London, England. Jun 5-16, 1972, known as the Earth Summit in Stockholm, also marked the successes of concerned efforts to bring the problems and the urgent need for remedial and preventive action into world-wide focus (MOE, 1994). As it is stated in the guide line document prepared by MOE the meeting was done through United Nation Agencies and Non-Governmental Organizations and made several recommendations, one of which was the establishment of UNEP. It is further explained that environmental agreement and polices have become institutionalized over the last century, with an upsurge since the world's first summit on the environment in Stockholm, Sweden in 1972.

As to Rosenthal (2006), the Declaration of the United Nations Conference on Human Environment laid out a set of broad and symbolic guidelines for state environmental policies except being non-specific about methods, objectives and themes, calling only for to environmental education include adult, youth, the unprivileged and the media.

Rosenthal further explained that Belgrade Charter defines the goal of environmental education as to develop a world population that is aware of, and concerned about, the environment, and which has knowledge, skills, attitude, motivations and commitment to work individually and collectively toward solutions of current problems and the prevention of new ones.

In 1975, UNESCO in cooperation with UNEP hosted the international Environmental Education for environmental educators, governments, NGO representatives from around the world (MOE, 1994), which the quorum produced the Belgrade Charter. As it is clearly stated in the Methodological Guide for Environmental Education in Ethiopia (MOE, 1994), the Belgrade Charter listed six objectives of environmental education: awareness, knowledge, attitude, skills, evaluation ability and participation. The guideline quoted the general idea from the charter as "environmental education should consider the environment (in its totality) be interdisciplinary, encourage participation and cooperation and focus on major environmental issue of today and the future". (p. 6).

The world first intergovernmental conference on environmental education was organized by UNESCO in cooperation with UNEP and was convened in Tbilisi, Georgia from Oct 14-26, 1977, (UNESCO-UNEP, 1978). The Tbilisi Declaration updated and clarified the Stockholm declaration and the Belgrade charter by including new goals, objectives characteristics, and guiding principles of Environmental Education. (NAAEE, 2008).

The Tbilisi declaration outlined five categories of objectives for environmental education; awareness, knowledge, attitude and participation and also constitute the framework, guiding principles and guidelines for environmental education at all levels-local, national, regional and international and for all age groups- both in side and outside of formal system (UNESCO-UNEP, 1978).

The environmental education should, in this regard, help to develop a sense of responsibility and solidarity among countries and regions as the foundation for new international order which will guarantee the conservation and improvement of the environment.

Another new concern in Tbilisi declaration (Ibid) was that environmental education should cater to all age and socio-professional groups in the population:

- To the general non-specialist public young people and adults whose daily contact has a decisive influence on the preservation and improvement of the environment.

- To particular social groups (professionals), scientists and technicians whose work laid formation of knowledge for education, training and efficient management of the environment.

This declaration further underlined that to achieve the effective development of environmental education, full advantage must be taken of all public and private facilities available to the society for the education of the population; the formal, non-formal education and the mass media (Ibid). As time passed environmental education was connected to environmentally sustainable development. The Rio declaration in 1992 is the first international environmental agreement to explicitly name sustainable development as a method and goal for an environmentally healthy world (Rosenthal, 2006).

As to Rosenthal again environmental education strategies in the document was to include: Multidisciplinary approach, use of scientific evidence and appreciation of source of knowledge; formal and non-formal education from the media, NGOs, and the government; E.E coordinating bodies; training programs and hand-on learning environmental education. It also called for integration of diverse knowledge systems and traditional and socially learned knowledge through means based on local customs, especially in rural areas. Rosenthal (2006) further discussed that the world summit on sustainable development in Johannesburg, 2002, commonly known as Rio+10, reaffirmed the world's commitment to environmental conservations and sustainable development including environmental education, but Tbilisi Declaration is still the foundation for environmental education.

As to Sato (2006) another important resolution of the UNCED in Rio de Janeiro in 1992 was Agenda 21, which specified Non-Formal Education, that is the need to increase environmental awareness and undertake specific public education programs to influence positive attitudes and appropriate behavior of various segments of the population towards sound and responsible environment and natural resources management as well as sustainable development. In line with this, FAO established a new department in 1995 called Sustainable Development and intensified efforts in promoting Environmental Education and Training among its member countries even though the integration and development of environmental education through agricultural extension programs has been started as early as 1987 in Indonesia by FAO technical cooperation project (Ibid).

Since then, efforts have been spearhead to integrate environmental education into both formal and non-formal education system of all ages.

2.2.2. Concept of Environmental Education

The concept of environmental education (EE) has evolved since the name environmental education was used in the community (Sato, 2006). According to Sato, the concept of environmental education was first formalized by the International Union for the Conservation of nature and Natural resource (IUCN) in 1970 at a meeting in Nevada, USA and was defined as a process of recognizing values and clarifying concepts in order to develop skills and attitudes necessary to understand and appreciate the interrelatedness among man, his culture and his biophysical surroundings. Environmental education also entails practices in decision making and self formulating of code of behavior about issues concerning environmental quality.

For Sytnik et al (1985: 11) and Jacobson (1985) in Melaku (1994) "environmental education is not a separate branch of science or special subject of study, it involves teaching about value judgments and the ability to think clearly about complex problems of the environment-which are as political, economical, and philosophical as they are technical "(p. 25).

According to UNESCO and UNHCR (1999) Environmental Education is a theme that deals with the issues of human beings in relation to the environment, its utilization and conservation. It is one of the means of preparing individuals to live in harmony with the environment and take care of it.

From the point of view of integration of environmental issues into the education system, Lucko et al in Aklilu (2006) defined environmental education as "a process aimed at providing a citizenry that is: knowledgeable about the biophysical and socio-cultural environments of which man is a part, aware of environmental problems and management alternatives of use in solving those problems and motivated to act responsibly in developing diverse environments that are optional for living a quality life" (p. 19). This definition seems to have been more comprehensive

and elaborative than others. Because it reflects the basic learning and teaching domains: knowledge, skill and attitude which the present researcher is most interested in.

The International Environmental Education Program (IEEP) was established to make environmental education interdisciplinary in approach, encompassing all levels of education (in school and out of school) and directed towards the general public, in particular the ordinary citizen, living in rural and urban areas, young people and adults alike, with a view to educating them as to simple steps they might take to manage and control their environment (UNESCO-UNEP, 1976).

At the 1977 Tbilisi Conference drew up a fairly coherent concept of environment education regarding its goals, objectives, guiding principle, Models of implementation and key points on environment education and awareness raising (UNESCO-UNEP, 1978).

2.2.3 Goals, Objectives and Guiding Principles of Environmental Education

According to Ministry of Education of Ethiopia and UNESCO the Goals, Objectives and Guiding Principles of Environmental Education in Tbilisi declaration were defined as follows:

A) The goals of environmental education are:

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

B) The categories of environmental education objectives are:

Awareness *– to help social groups and individuals acquire an awareness and sensitivity to the total environment and its allied problems.*

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

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

10. *Help learners discover the symptoms and real causes of environmental problems;*
11. *Emphasize the complexity of environmental problems and thus the need to develop critical thinking and problem-solving skills;*
12. *Utilize diverse learning environments and a broad array of education appropriates to teaching, learning about and from the environment with due stress on practical activities and first- hand experience(UNESCO- UNEP, 1978; MOE,1994)*

2.2.4. Environmental Issues Related to ANFE

Environmental issues are contents of environmental education that should be addressed at all levels of the environment local, national and global (Aklilu, 2006; UNEP, 2006). In its broadest sense environmental education as content includes a study of conservation, preservation of ecology, and resources management. This phase of curriculum focuses on those things that support or enhance the lives of individuals such as water, air, noise shelter, soil, natural resources and nature's balance" (Allman et al, 1982:3).

As to Lawrei (1993), for many years environmental issues were essentially of local or rarely regional extent. It is further explained that positions has been changed drastically over the past few hundred years as the world population numbers have increased, and technologies developed, to the point where human being are now extremely potent factor. Demil (2003) explained that environmental issues in Ethiopia are resource management, conservation and environmental degradation. The following are key environmental issues and activities which are proclaimed by United Nation Higher Commission for Refuges (UNHCR) concerning Non Formal Environmental Awareness-Raising:

1. *Environmental education should be built upon existing ecological knowledge and skills.*
   The host communities have considerable environmental practices to share with one another. Effective environmental education should target community groups, including women's groups and youth associations, which have the capacity and well to promote sound environmental management.
2. *Early, targeted environmental awareness campaigns are valuable in setting the parameters for sound environmental behavior.*
   Awareness programmes should be introduced before dwellers have established environmentally damaging systems of behavior that are difficult to change: for example, in the styles of shelter they build, the areas in which they cut trees, or the cooking systems they use. Messages to be communicated typically relate to

local and/or national laws, for example, on which practices are permitted and which are discouraged or prohibited.

3. *When new settlements are established, settlers must be informed of regulations regarding natural resource use.*
   Rules concerning natural resource use should be made clear from the outset. These may relate to tree cutting, charcoal making or management of wood-harvesting areas.
4. *Multiple entry points must be available for environmental awareness-raising.*
   Non-formal environmental education can be channeled through health programmes, adult literacy classes, video sessions, religious services, notice boards, drama and poetry festivals, competitions, etc. Networks of community service and health workers can be particularly effective in passing on appropriate environmental messages, given adequate training.
5. *Signs and posters communicating rules, regulations and sound environmental practices must be supported by, and linked with, other activities.*
6. *Environmental awareness raising and training must include measures to empower communities and their management institutions.*
   Training and educational initiatives undertaken with local communities will have limited impacts if these communities are unable to put the lessons into practice. Land access rights, institutional capacity and appropriate incentives can better ensure participation in sustainable management activities (UNHCR, 2002: 64-65).

As it is stated above Formal and Non-Formal approaches should be harmonized for better results of environmental management.

Non-formal approaches will be more effective if the community participation to environmental education is adopted. Schools must not also be treated as isolated islands of knowledge; they must be seen as part of the community. Likewise, the community must be brought into the regular schools, for sharing experiences too.

From the above discussed ideas, since the goals and objectives of environmental education focus on relating education or training to our real environment, the focused environment issues should be then global warming, poverty, land degradation, soil erosion, water pollution etc. Many research findings call the above environmental issue '' empirical elements'' (palmer, 1998; Scott and Gough, 2004 in Damitew, 2007; MOE, 1994) .According to UNESCO –NUEP (1985: 127) and MOE, 1994:10) there are other environmental issues as for as environmental education is

concerned. These are "ethical elements" which include ethical consideration in consuming, preserving, protecting etc of environmental problems and conflicting issues.

The last but not the least environmental issues, as for as environmental education is concerned, are "aesthetic elements"; learning by doing, touching, observing, appreciating and practicing (Beck and Earl, 2000 in Damitew ,2007 and MOE,1994) . Of the three environmental issues UNSCO –UNEP (1985) seemed to give more attention to the second one, ethical element. It states:

> *though environmental education as a distinct entity is of a recent origin, its contents have been included on different subjects like nature studies, field studies, biology and geography .But these curricula were concerned only with two demonstration related to the environment, viz. learning from or through the environment (aesthetic elements) and learning about the environment (Empirical elements). A vital third dimension, learning for the environment (ethical element) was missing (p.8)*

2.3. The Practice of Environmental Education: Adult Non-Formal Education in Focus

The phrase "environmental education" commonly conjures up images of smiling school children fascinated and enthralled by learning about the natural environment. Environmental education however is not just for children or just for schools.

2.3.1. Global Situation

The 1977 Tbilisi Declaration stated that environmental education should cater to all ages and socio-professional groups in the population (UNESCO- UNEP, 1978).Similarly American Ninth Annual National Report on environmental attitudes, knowledge and behavior structured those government agencies in such a way that they support environmental education programs for adults (Roper, 2000).

Therefore environmental education for adult learners should be beyond creating understanding and initiate actions, where as it should be aiming at developing skills, creating sense of commitment and stimulating individual and collective actions.

As it was stated in the Fifth International Conference on Adult Education in Hamburg, organized by UNESCO (UNESCO, 1997), environmental education needs to address all sectors of the society: People, community, public institution, private sector, governments, policy makers and international organizations (p. 5). The document further stated that the integration of environmental education "into general and vocational adult education" should be meaningful to Adult in their daily lifestyles, needs to address ecological questions in terms of social, political and economic factors "(p.6).

According to many writers like Ballantyne, Connel and Fien (1998) environmental education for adult needs a wide support from professionals and the public alike. They further explained that with the exception of college and university instructions environmental education for adults tend to be non-formal and often not highly visible. Environmental education for adults, according to Environmental Education and Training Partnership (EETP, 2004), is better to be conducted as evening classes or weekend classes focusing on various topics in ecological process, environmental issues, human dimension of resource management and several other topics.

As to Mader (2001) and Kimmel (1999) environmental education for adults should be given in such a way that participants come to appreciate the complex and dynamic nature of ecosystems as well as the relationships between human and natural processes. Many countries of the world like Australia, Canada, China, Greece, South Africa, Spain, Srilanka and USA are now practicing environmental education in both formal and non-formal education systems at all levels (Palmer, 1998).

Many African countries like Uganda, Kenya, Zambia and Tanzania integrated E.E at primary levels of formal education system and Zambia also did it at secondary level (Lindhe et al in Aklilu, 2006).

However, in spite of strong statements in favor of environmental education, it has not become a basic educational curriculum in many parts of the word or delivered valid (NEEAC, 2005 in Rosenthal, 2006). According to Rosenthal, international leaders have failed to fully fund established environmental adult education programs housed in the United Nations Education program (UNEP) and UNESO. These challenges are especially deleterious for developing Countries, Which have fewer resources and expertise at their disposal for building strong adult education systems.

According to Owens (1991) and UNEP (1988) in Desalegn (1998) a survey conducted in member states of European Community showed that, Community citizens on the whole were not particularly conscious of pollution on their own local areas. A survey also indicated that the awareness of environmental problems of the community in Great Britain has been diffused among the public to the extent of perceiving environmental problems second only to a super – powers conflict as the greatest threat to human race.

Although similar surveys are not available from developing countries, it seems that most of them, with their increasing debt burdens, economic problems and highly waving world current financial and economic crises, give priority to economic growth, even at the expense of environmental education. In the same way the findings revealed that awareness of environmental problem in Africa , is by far more felt amongst intellectuals, , professors and to a lesser extent, university students than sectors engaged in agricultural and industrial production (UNESCO-UNEP,1997)

2.3.2. Environmental Education in Ethiopia

a) General

The constitution of the Federal Democratic Republic of Ethiopia (FDRE, 1995), which is the supreme law of the country, sets the overall environmental values to be preserved and protected in the country. In Article 43 and 44 of the constitution sustainable developments and a clean and healthy environment is expressed as the fundamental right of citizens. In the same manner the overall objective of the environmental policy of Ethiopia (EPA, 1997) is to:

> *Improve and enhance the healthy and quality of life of all Ethiopians and to promote sustainable society and development through the sound management and use of natural, human made and cultural resources and the environment as a whole so as to meet the needs of the present generation with out compromising the ability of the future generation to meet their own needs (p. 3).*

Among other things the environmental policy seeks to:

- Prevent the pollution of the land, air and water in the most cost-effective way so that the cost of effective preventive intervention should not exceed the benefits.

- Ensure the empowerment and participation of the people at all levels in environmental management activities.
- Raise public awareness and promote understandings of essential linkages between environment and development etc.

From the guiding principles in the policy document (EPA, 1997), increasing awareness and understanding of environmental and resources issues shall be promoted by policy makers, government, non-governmental officials and by the population at large and adaptation of "conservation culture" in environmental matters among all levels of the society shall be encouraged (p. 6).

In the policy document the "integration of environmental education" is emphasized in formal curricula, which is stated as to promote the teaching of environmental education on a multidisciplinary basis and to integrate it in to the on going curricula of schools and colleges and not treat as a separate or additional subject, though this also should be done at the tertiary level (p. 24). But on the other part of the policy document environmental education for adults is paraphrased as "environmental awareness and public education programs" should include both the men and women in all social, economic and cultural growing of the society with elimination of inequities both in formal and non-formal training in environmental and resources management including methodologies and tools implementation, (p.20).

From the above statement we can see the acquisition of powers by the community to make its own decisions on matters that affect its life and environment. The integration of environmental issues into adult non-formal education, in the policy documents is also stated as:

> *Full environmental cost that may result through damage to resources or environment as a result of degradation or pollution should be incorporated into public awareness programs (EPA, 1997: 5).*

In line with this many researchers tried to assess the integration of environmental education in to formal education systems in relation to knowledge, skills and attitude of students in both global and Ethiopian context, (Melaku, 1994; Abishu, 2002; Abera, 2004; and Damitew, 2007).

Melaku (1994) for instance, in his research in TTIs, assessed and proved that there is a failure of the integration of environmental education objectives and teaching methods into geography and history syllabi of trainees. From teachers point of view, he found that almost half of the trainees were having poor environmental knowledge but having very high favorable attitude to environmental education and environmental problems.

In the comparative survey study in both developed and developing countries of the world on the integration of environmental education in to school curricula (UNESCO-UNEP, 2000) it was found that environmental education contents had focused on environmental problems of global, national and local issues. The need for population control, need to balance development and resources consumption and life style of the community were some of the contents (environmental issues) which were incorporated in the curricula.

In the study, methods like problem solving, experimentation, field studies, projects, simulations and role playing, brain storming, discussion, case studies, survey etc were recommended in the process of integration of environmental education in teaching process.

The Environmental Education Pilot Project in Ethiopia (1985-1992)

The Environmental Education- in Ethiopia was initiated by ministry of education to develop awareness and understanding of the existing environmental problems among teachers, pupils and adults in the formal and non-formal educational system (MOE, 1994) and to make existing curricula indigenous (Aklilu, 2006; Gebeyehu et al, 1992).

The major goals and objectives of the EEP as stated in Beletu and Yosef (1990) were:

a) Goals

- To create awareness of environmental problems in urban and rural areas, especially in the drought stricken and degraded areas.
- To help people, living in areas, with serious environmental problems acquire basic knowledge and skills in minimizing environmental problems.

- To help local communities raise the general awareness and understanding of the consequence of natural resource depletion and the need to conserve, protect and rationally utilize their natural resources.
- To support the existing educational system through the dissemination of technical information and through training of staff.
- To support the formal and non-formal education system in organizing and starting community based development.

b) Objectives

- To assist the on-going natural resources conservation and development projects.
- To make individuals and social groups understand the need and importance of personal and environmental hygiene, safe drinking water and a balanced diet.
- To help individuals and social groups conceive the way, disease are transmitted.
- To help individuals and social groups realize the importance of family planning.
- To support extra-curricular activities and labor education in schools.
- To help pupils, adults, ordinary men and women and social groups in general better comprehend interrelationship and interdependence of natural phenomena.
- To help learners develop love for nature and to acquire knowledge and skills on how to conserve, protect and develop natural resources.
- To promote mutual understanding and co-operation between school and community (MOE, 1994: 8-9).

Short comings of environmental education pilot project in Ethiopia

It is the belief of many environmentalists that poverty and developing are two tensions which are essentially caused by lack of required awareness for the environment.

According to Filho and Hale (1993) attending high educational level may not guarantee one's concern for the environment (ethical element of environmental education); as long as one's handling of the environment is poor, one is illiterate for this particular issue. Therefore, people need to learn for the environment which helps them to think and act holistically for the environment.

Though, Ethiopia is one of the countries committed for Stockholm conference (MOE, 1992) environmental education was given less or no attention for along time. Environmental education project in Ethiopian (EEP) was the first notion to bring environmental education in effect.

Even though EEP had a good start, it was not with out imperfections. The first problem was its sustainability. According to Gebeyehu et al (1992) and Demil (2003), the project was not able to sustain its effect. The main reason was that it was not systematically integrated as part of the formal curriculum.

Another short Coming of the pilot project was that it did not practically bring about behavioral change as it was expected. By using MOEs delivery net Work, the project sought to develop awareness and understanding of the existing environmental problems among teachers, public and adults in the formal and non-formal education'' (MOE, 1994:7) .But According to many writers (Demil, 2003 ;Aklilu, 2006) and MOE(1992) and MOE(1994) ,the project lacked to achieve its goals in this respect. Aklilu pointed out that though there were issues of the environment addressed in some subjects, the integration was not in a way to bring a practical impact on the environment. Similarly, Environmental Education Guideline (MOE, 1994 :7-8) paraphrased the short coming of the pilot project as "when the project was envisaged as part of an integrated plan of action, emerging from the conservation based development strategy, adopted for high land areas of Ethiopia, it was thought that practical activities would be combined with theoretical knowledge ''.Again according to environmental policy of Ethiopia (MOE, 1992) the pilot project was forced to be limited used as a tool only to alleviate the on going periodic famine, epidemics and migration around the problem areas. Demil (2003) in his paper presented for civic society concerning environmental problems, summarized the weak point of the project as,'' if people were well informed about the effect of their unfriendly activity on the environment and understand that they were compromising the rights of both the present and the future generation, there would be no reason they continue with their unfriendly skills on the environment (P.10).

Another problem, which might be considered as the third short coming of the pilot project, was its coverage. According to Aklilu (2006), though the project was intended to address some sorts of teachers, pupils and adults in both formal and non-formal education, the project was limited to very insignificant number of regular schools. However, the present researcher failed to see any practice derived from this pilot project to adult non- formal education.

In sum, since the scope of the EEP was limited to small portion of the community and dealt with some aspects of environment in addition to its donor oriented nature, it has done little effect to school, in particular and the community in general.

Thus, because environmental education is expected to address all sectors of the society, it is the call of the day to conduct research on the integration of environmental education in to adult non-formal education.

b) The Place of environmental education in Adult Non-Formal Education

The place of environmental education in Rosenthal (2006) from Tbilisi conference in 1987 is stated as E.E should be aimed at all members of a community in ways corresponding to the needs, interests and motivations of different age-groups and socio-occupational categories; it should be adapted to different socio-economic and cultural context and to different living conditions, and should take account of regional and national differences.

The world summit on sustainable development (UNESCO, 2002) re-oriented education focused sustainable development as it requires a new vision for environmental education including formal education, public awareness and training.

For achieving environmental and ethical awareness, values, skills, attitudes and behaviors consistent with sustainable development and for effective public participation in decision-making, governments, international agencies, business and civil society groups were called on (Ibid) to:

- Ensure that basic education and functional literary for all is achieved.
- Make environmental education available to peoples of all age.
- To integrate environmental concept into all educational programs, with the analyses of environmental problems.

From above stated ideas it can be easily observed that environmental education is not only confined to formal education systems for school children but to all age groups who are participating in non-formal education.

Adult non-formal education includes, from Ethiopian context, "literacy, skill training, family planning and agricultural extension" (Dessu, 2005: 173).

Adult education is "a powerful concept for fostering ecologically sustainable development for promoting democracy, justice, gender equity and scientific, social and economic development and for building a world in which conflict is replaced by dialogue" (UNESCO, 1979: 1).

The goal of environmental education in the same manner is "to develop a world population that is aware of and concerned about the environment and its associated problems and which has the knowledge, skills ... commitment to work toward solutions for current problems" (UNESCO-UNEP, 1985: 18).

In broadly speaking the goal of environmental education is highly related to the concept of Adult Education. Non-formal education refers to all organized and to semi-organized education and training activities that operate outside the regular structure and routines of formal education systems serving a great variety of learning needs of different sub groups of the population both young and old (Bishop, 1989: 25).

Mamo (1996) and Hailesilassie (1999) in Biruk (2006) proclaimed ANFE in Ethiopia as community training centers, vocational training programs, community development and political education. Similarly for Dessu (2005) in multiethnic countries like Ethiopia, adult non-formal education is needed to promote the level of people's awareness for active participation in development activities.

According to National Adult Education strategy (FDRE, 2006) adult education is not limited to those component offered in ESDP III- for adults but other components like health, agriculture

and environment should be conducted in adult education. The new concept in this strategy is that adult education is effectively linked to providing "knowledge and skills" in areas of life such as agriculture, health, civics and technical activities (p. iii).

People's awareness of environmental problems varies from country to country, from region to region; this difference is worse in developing countries than developed ones.

According to the report by UNESCO (UNESCO-UNEP, 1983) the awareness of environmental problems in Africa is by far felt among more in intellectuals than those engaged in agriculture or industrial production. Similarly the farmers and the communities in Ethiopia amongst which "the conservation and afforstation programs" had operated over the years did not integrate the innovations in to their activities (Yeraswork, 2000: 71).

As to Aklilu (2001) it is very fortunate that the magnitude and seriousness of the problems of natural environment are duly recognized by both the government and non-governmental organizations, there are however divided views as to whether the problem is well recognized by the grassroots population. Aklilu (2001:53) quoted that "peasants (in North Central Ethiopia) have not yet clearly understood the direct connection between deforestation and soil erosion or else it is not a problem which takes priority in their minds".

On the contrary Belay (1992: 55) in Aklilu (2001: 46) revealed that "farmers in 'some' areas of southern Ethiopia have a very good perception of the erosion natures".

Since the role of Adult Education is "to help people to adjust to changes and to understand the problems and find solution "(Tilahun, 1987: 44) or to prepare the community to participate effectively in the development activities and upgrading traditional skills (FDRE, 2006: 8), integrating environmental education has a potential for fostering ecologically sustainable development and help the people to live in harmony with the environment they live in.

2.4. Techniques to Integrate Environmental Issues

The overall goal of the United Nations Decade for Education for Sustainable Development (UNDESD) was to integrate the principles, values and practices of environmental issues into all aspects of education and learning (UNESCO, 2005a). As environmental education focuses on improvement of environment and its quality, special focus on environmental education in UNDESD was given to top down approach, quality focused, knowledge transfer, cause effect relationship and problem solving (Sato, 2006). For Sato (2006) environmental education for sustainable development should be given to participatory learning based on bottom-up approach, quality focused, knowledge acquisition, construction of values and ethics and attitude change through both formal and non-formal education. Sato further explained that "teachers", school teachers, non-formal mobile educators, NGO facilitators are able to take initiatives in organizing and implementing educational activities.

In this approach, individual capacity like values, ethics, and attitudes or institutional capacity like management, or civil capacity like participation and collective decision making, or learning methods like decision making process, social support system and problem solving are the points to be considered.

From the point of view of curricula, there are two methods or ways of addressing environmental issues: interdisciplinary or multidisciplinary (MOE, 1992; UNESCO- UNEP, 1988 in Dessalegn, 1998).

In interdisciplinary approach contents are treated in separate subject where as in the case of multidisciplinary approach contents are integrated across relevant disciplines (Filho and Hale, 1993).

According to Allman, Kopp and Zufelt (1982), multidisciplinary approach as an appropriate method is emphasized as "at all grade levels, much of the content of environmental education has been presented to learners through content areas of science, however emphasis must be placed up on environmental education in all areas of study through out the educational career" (p.5).

In other words, Ali (1990) advises inter disciplinary approach because multidisciplinary approach needs competitive educators. According to him interdisciplinary approach is more helpful to develop critical thinking, problem solving and decision making skills as the issues are treated separately.

As to Roth (1978) both two approaches can be treated in different ways at different levels: at the elementary level environmental education can take the form of science enrichment curriculum, natural history of field trips, community service project; in the secondary school environmental curriculum can be a focus subject with in the sciences or is a part of students interest groups on clubs, and at the graduate and under graduate level it can be considered as its own field with in education, environmental studies, environmental science and policy, ecology, or human cultural programs.

The approach to educating for the environment should be inter-disciplinary and cross curricular, because a commitment to educate for the environment can influence and change the attitude and social obligation of learners (Hale, 1993). For him formal courses should also cover information about the environment, but the latter approach is granted to change the attitude or life style of the learners.

Gruenewald (2004) presented alternative ways of integrating environmental education into curriculum, such as introducing spiritual development and indigenous knowledge systems (IKS). The complex set of knowledge and technologies existing and developed around specific conditions of communities indigenous to particular geographic area should also be integrated (McGovern, 1999).

Bekalo and Bangay (2002) called for adapting environmental methods to the reality of the place where it is being instituted in their study of circumstances of poverty and environmental degradation in Ethiopia. They recommended that the best solution is to institute non-formal environmental education for adults in rural areas, which should help to improve environmental health and economic successes, allowing potential learning to live better in their environment.

2.5. Evaluation Techniques in Environmental Education in Relation to Adult Non-Formal Education

Evaluation is "the process of determining the extent to which the educational objectives are being related by any program of curriculum and instruction" (MOE, 1994: 54).

According to this guideline document, the cognitive, affective and skill objectives of environmental education should be evaluated, since these objectives are useful in describing outcomes and providing direction for more specific and measurable behavioral objectives.

a) Evaluation of Values and Attitudes

As it is already stated in different parts of this research, the general objective of environmental education is to help learners acquire an appropriate knowledge of their environment and an active concern and motivation to maintain and improve the quality of their environment. The Educational Guideline stressed "the major goal of environmental education is attitude change" (MOE, 1994: 56). According to this document, values and attitudes which are directed to tangible objects and events (e.g. love of trees, flowers) or intangible ideas and thoughts (e.g. honesty) can be evaluated-either through direct observation of students' activities using contrived situations to test students reaction e.g. purposely placing litter along their route or through paper and pencil tests such as rating scale- or rankings.

As environmental education includes value oriented nature and community oriented strategy, the usual paper pencil test that focus on cognitive domain is inadequate to evaluate E.E, rather the right evaluation techniques like observation, awareness test, rating scale, personal reflections and reactions are recommended to identify learners' attitudes and problem solving skills (UNESCO-UNEP, 2000).

b) Evaluation of Knowledge and Understanding: Preventing and solving environmental problems requires a broad knowledge and understanding of many things including concept related to ecology, human health etc (MOE, 1994).

Usually action verbs like recall, repeat, analyze, define etc are used in evaluating the learners knowledge and understanding.

C. Evaluation of Skills: The problem-solving is the most important distinguishing characteristic of environmental education (Tbilisi- 1977 in MOE, 1994). According to this document thinking skills like application, analysis, synthesis and evaluation can be evaluated. Application is the ability to apply knowledge and new ideas to develop better understanding and solving problems where as, analysis is the ability to break down ideas, objects and events including problems and issues in to their parts. Synthesis and evaluation are the highest level of skill which the former is the ability to put parts and elements into unified whole where as the latter is the ability to judge the values of ideas, objects and events using appropriate criteria.

CHAPTER THREE

3. METHODOLOGY

3.1 Research design

According to Creswell (2003), there are three major research approaches: quantitative, qualitative and mixed. To him the choice of one from the others depends on three major factors: the research problems, personal experience of the researcher and the audience.

As the purpose of this study is to investigate the integration of environmental education into adult non-formal education programs, mixed approach has been chosen as an appropriate method for triangulating findings, elaborating results and discovering contradictions. Mixed approach was chosen because of the difference in audiences which range from illiterate farmers to educated program organizers and educators. The method employed was to see and relate the achievements and competency of trainees in environmental knowledge, attitude and skill.

3.2 Sample size and Sampling Techniques

The subjects of the study were 306 trainees, 7 facilitators, 2 program officers at office level and one training director at the head office, and 4 Zone Agriculture and Rural Development Department experts. Besides, training modules and different catchments areas were employed as sources of data.

Among seven adult training centers run by Agri-Service Ethiopia in the selected Zone, five of them were chosen randomly and one center, other than those mentioned above, was used as site for pilot study. Fifty percent of the trainees (the total of 154 trainees) in each center were selected using systematic random sampling technique. The names of both female and male trainees were separately and alphabetically listed. To set a point of reference number 2 was randomly selected. Through this procedure every even numbered were selected as respondents. Random sampling was used for sampling technique because it is an appropriate method to take large sample from relatively large population by giving equal chance for each respondent (Pagano, 1998)

Eighty percent of facilitators in the sample centers were randomly selected. All office program officers (two in numbers) and two zone experts were taken purposely .Those zonal experts who were assumed to be nearer to the adult training program than others were taken as the respondents here. Thirty percent of catchment areas were also taken by the method of random sampling. Regarding teaching materials all the modules (two in number) assigned for that training time, were taken and analyzed.

3.3 Data Collection Instruments

In this study achievement tests, attitude inventory, Likert scale and rating scale type questionnaires, were developed to collect data from trainees. Interviews for experts and observation checklists to collect data from catchment areas were prepared. Coding sheets were also prepared to collect data from teaching and learning modules. Focus group discussion has been employed to triangulate data gained from trainees through questionnaires and achievement tests.

3.3.1 Achievement tests

As it is stated by Shaycoft (1979) in Damitew(2007), it is very difficult to get standardized test to measure learners' knowledge. Typically to measure learners' environmental knowledge where environmental problems and issues are different in degree of seriousness and type, the present researcher did not use an achievement test type developed for regular students. Therefore, the researcher adapted the tests with the help of subject area specialists by telling them his purpose and a study area covered. In line with these steps of constructing tests, four persons specialized in the same area were requested to be part of this work based on the objective of the test defined by the researcher to measure learners' environmental knowledge. As to Carton (1976) and Wiersman and Jurs (1985) in Atlabachew (2007), subject teachers are recommended to develop achievement tests for quantitative researches.

The present researcher has chosen criterion referenced test to measure environmental knowledge competency, because it is recommended today for use in educational decisions about individuals, groups and programs (Melaku, 1994) .The test items were drawn from the modules in question, and reduced from twenty to eighteen to avoid repetition, monotony and level of difficulties with the help of the area specialists and the advisor(see appendix II) .

To measure how much the trainees have achieved environmental knowledge a pre determined standard was set up. To Fraenkel & Wallen (2000), 80% agreement is a commonly criterion cutoff score for regular students. As to Popham (1981) and Ebel (1979) in Melaku (1994), standard setting procedures can be determined based on judges. Their suggestions stressed the importance of having judges not only for considering the difficultly level of individual items, but also the quality of the items themselves. Popham in Melaku (1994) stressed that informed judgments will generally be far better than judgments made in absence of relevant information.

The large numbers of methods for setting performance standards can generally be characterized as examinee-centered, test-centered or a combination of these two approaches (Jaeger, 1989). Examinee-centered methods are based on judgments about examinees. In examinee-centered method judges categorize examinees according to performance level (e.g. non–qualified, qualified and borderline) based on some external criterion other than the test score (Giraud et al, 2000). Typically, the test is then administered to the categorized examinees and the cut-score is set based on their results on the test (Cizek, 2006). According to Cizek (2000), judges (in most cases, the subject teachers) are asked to conceptualize the characteristics of group examinees and identify specific examinees that fit these characteristics and then the assessment is administered, scored, and analyzed and the medium score is typically used as the cut-score. A potential problem of examinee centered method is that the cut score arrived at by teachers with high performing examinees tend to be higher than the cut- score from the teachers with low-performing case (Living stone and Zieky, 1989)

The second method, test-centered method is carried out based on judgments about items in a particular assessment. During the review of the assessment items, the judges decide on the level of performance required to meet each performance standard (Kane, 1998).For Kane the Angolf method, which takes the average of judged scores as cut-score, is one of the well-known examples of test centered methods which have been modified and extended in many ways .

The Anglof Method was used or chosen in this study because it is widely used method and easily administered, that is it gives compensatory cut score (i.e. a high score on one item can balance a

low score on other item). Using this method, for each judge, the estimated probabilities were summed and averaged across four judges to arrive at recommended cut-score, 60%. As a result, 60% correct level has been taken as a standard or criterion against which the trainees' knowledge was measured. Therefore, any trainee who was measured up to this criterion was said to have environmental knowledge competency if he/she scored 60% and above, while the one who scored below 60% was considered to have unacceptable performance.

With respect to reliability, the test was first administered to a sample of 21 trainees in Doma training center. The reliability was then calculated (0.710) using split-half method. Based on this result two items were dropped and two items were modified (Appendix VII-B). According to Caplan, Naidu and Tripathi (1984) in Atilabachew (2007), this test (0.710) is reliable as 0.5 or higher are adequate scores for research purposes. This value is even above the benchmark set for classroom regular student tests, 0.70 and above (Franckel and Wallen (2000).

Once the achievement standards have been set, they need to be validated. As to Kane (1998), it is important to understand that it is not the achievement standard (or cut score) it self that is valid or invalid, but the interpretation and use of achievement standards. In this study the experts in the field and the advisor were participating in approval of the content. To check whether the test constitutes items that logically reflect the knowledge domain at that level they try to see the content validity and the test has become ready for use after approval.

3.3.2 Liker-Type Scale- for Attitude Inventory

To identity learners attitude to their environment, especially in utilizing and protecting it, 10 attitude items were developed based on likert type scales ranging from strongly agree to strongly disagree. The items were adapted from the modules prepared for training (ASE, 2003, 2001) based on review of related literature. Six of the items were worded so as to express favorableness, while the other four (5, 6, 7 and 9) were to reflect definite unfavorableness (Appendix I-part II). In scoring favorable items the alternatives were weighed 4,3,2,1 going from strongly agree to strongly disagree. On the other hand in scoring unfavorableness, these weights were reversed. Therefore, the score of any individual would fall between 40 (Maximum) and 10 (minimum). Hence, a high score exhibits a high favorable attitude, whereas a low score manifests the low favorable attitude. The reliability of instrument i.e. internal consistency was

tested by using SPSS packages (r=0.812 appendix VII-C) and the result revealed high reliable instruments (Allen, 2002). According to Allen (2002) commonly acceptable rule of thumb is that Cronbach's alpha of 0.6-0.7 indicates acceptable reliability, and 0.8 or higher indicates good reliability. Highest reliabilities (0.9 or higher) are not necessarily desirable as this indicates that the items may be entirely redundant. The items in this attitude inventory were, therefore, taken with some simple modification. There were no items dropped in this case.

3.3.3 Rating Scale for Environmental Skill

As it is stated in the Methodological Guideline for Environmental Education (MOE, 1994), the skills of the learners are more difficult to measure and assess than knowledge and understanding. The report of Tbilisi's conference stated in this document went on choosing direct observation and follow up procedures to measure the learners' skill. But the present researcher has got this procedure inconvenient because of time constraints. According to Gronlund (1981) in Melaku (1994), rating scales are the most helpful instruments in evaluating procedures, products and personal- social developments. As to Keach(1979) and UNESCO-UNEP(1984) in Melaku(1998) environmental activities deemed to be significant to equip learners with competence in the intellectual and problem solving skills. Therefore, the present researcher has chosen the latter procedure to measure the acquisition of learners' (trainees) skills by developing 12- selected activities and 7 items which can show practical activities of learners(Appendix I part III). The latter seven items were actually inconvenient to use rating scale, but 'yes' or 'no' reflections, were also chosen as additional instrument to measure acquisition of action skills. The procedures deemed to be supported by environmentalists (MOE, 1994) since skill measurement used action verbs like operate, illustrate, demonstrate, calibrate and so on.

The first 12 activities were prepared and presented as statements on a five point scale which rated from always to never. Therefore, the score of any individual would fall between 60(maximum) and 12(minimum). Values or scores fell on 'sometimes' were taken as cutoff scores while score above these score show higher (favorable) skill acquisition and scores below cut-off point show lower /unfavorable/ skill acquisition.

The second 7 items, which deemed to measure the ability of learners' skill in operation, illustration, demonstration and calibration what they learned would have 14 as a maximum and 7

as minimum scores. These items were identified by both the researcher and four post graduate students based on the teaching and learning materials. In this case the more 'yes' scores exhibits the better ability the respondents have in calibration, demonstration etc and vice versa.

In order to keep validity of the instruments the researcher has attempted to read as many descriptions as possible on the construction of and use of scales and consider the judgments and agreements of two graduate students in the field. The reliability of the items were checked by the SPSS packages (r=0.864 appendix VII-C) which shows very high stability as to Allen (2002). Therefore, all items were sustained.

In general after all questionnaires were tested for reliability in pilot study they were translated into Amharic language and become ready for use (Appendix-VI).
The pilot study was conducted in Doma training center by taking 21 trainees. This was done by the researcher. After data were collected from pilot site the reliability test was computed using split half method for tests and SPSS package for questionnaires.

3.3.4 Interviews

To elicit the needed information from the experts, program officers and facilitators , who have indirect and direct involvement to integrate and implement environmental education into adult – non formal education, a semi-structured interview was prepared and administered (Appendix IV)

In general two program officers (at Office level), one training director at the Head Office and two Zonal Agriculture and Rural Development experts were interviewed about their managerial and academic contribution to make the training effective in line with Ethiopia's current National Adult Education Strategy (2006), National Environmental Education Policy (MOE, 1992) and problem solving method in addressing the needs of the society (MOE, 1994).

Four facilitators were also interviewed about their contribution in bringing about behavioral changes of trainees in knowledge, attitude and skill.

3.3.5 Observation

To cross check the data that were collected from respondents, the researcher has conducted thorough observation from three training centers based on the developed checklists (see Appendix IV part II) and 30% of the catchments areas from the total of five sample centers (9- in number i.e. one area from Zimbitit, five from Dobbo and three from Gunguna were selected and observed. The checklists were prepared to collect data from chatchment areas, training sites and plots of key informants. The data were basically expected to be environmental activities such as environmental degradation, wise use of animal rearing, crop rotation etc. These checklists helped the researcher to collect data in the form of pictures and other raw data. Four key informants' environmental activities were also observed and they asked to explain their environmental activities when needed. Three key informants from Dibo and one from Gunaguna were interviewed about their some selected plots of land and livestock managements and their environmental activities were observed in conjunction.

3.3.6 Content Analysis

Frankel and Wallen (2000) stated that "content analysis as a methodology is often used in conjunction with other methods" (P.472). They further discussed that content analysis is used to analyze –curricula materials like textbooks, essays, novels, articles and so forth. According to these writers to conduct content analysis on a text, the text should be coded or broken down in to manageable categories on a verity of levels, words, sentences, phrases etc. and then examined using either of two basic methods: Conceptual or relational analysis. The present researcher has chosen two available training Modules (curricula materials) which were prepared for that specific period of time. One is titled as 'Family Planning' and the other is 'Conservation of Natural resources: water and soil.

According to Lewy (1977), Amare (1998), and kerlinger/1986/, the second step to perform content analysis is to define a series of relevant categories which support the researchers hypothesis. Regarding this, many curriculum evaluators have often used categories that demand descriptive, inferential or evaluative coding systems, and some of the frequently used categories are content (relevance of ideas, methods etc,) coverage (Knowledge, skill, attitudes etc) intentions, biases, oversights of authors and so forth (ibid)

According to Sarantakos (2005) and Amare (1998), categories created by the researcher must be pertinent to the objective of the study, should be functional, related exclusively to the topic, exhaustive and manageable. As it is clearly stated in the Environmental Education Guideline, discussed in the review literature part EE has four objective categories: awareness, knowledge, attitude, skill and participation. Environmental education contents have also four categories: empirical, ethical and aesthetic elements (MOE, 1994; Damitew, 2007). Based on these evidences, four categories and fourteen sub categories were employed in the coding process based on the identified basic question.

a) The presence of environmental objectives in the teaching modules with its sub categories such as environmental knowledge, attitude and skills.

b) The presence of environmental contents in the modules, with its sub categories such as ethical, empirical and aesthetic elements of environmental education.

c) The inclusion of teaching methodologies designed for environmental education into teaching modules. Its sub categories include outdoor education, simulation, case study, resources use and problem solving methods.

d) Environmental education evaluation techniques that help to evaluate knowledge, skills and attitude of trainees

To code the right data using already developed categories the researcher need to specify the unit of analysis in words, sentences, phrase, unit of books or entire books (Amare, 1998; Kelinger, 1986). Unit of analysis are words, symbols, items, sentences, and themes as well as messages and meanings which indicate the presence of one of the categories (Sarantakos, 2005:305). In this study the entire contents of available modules (two in number) were taken and analyzed.

In line with this, the researcher has chosen the following units of analysis. To assess the category of Environmental Education Objectives, the sentences explaining E.E objectives developed in training modules were taken as unit of analysis; to see the content integration in the modules, sentences explaining ethical, empirical and aesthetic elements were taken as unit of analysis. Finally to see how the evaluation techniques and teaching method were integrated, the evaluation items in the modules and methodologies developed, were taken as unit of analysis.

To check the reliability of the instruments used in content analysis, inter-rater agreement method was used. In this way the reliability of the coding was checked by taking two independent coders one the PHD student and the other post graduate student from Addis Ababa University and the result of objectives was checked (0.72), using Cohen kappa coefficient formula. As to Cohen (1960) the result showed almost perfect agreement and the instrument was taken with little modification. Similarly the Cohen's kappa coefficient of contents, methodologies and evaluation techniques were found 0.72, 0.79 and 0.81 respectively (appendix VII-A).

3.4 Methods of Data Analysis

All the questionnaires were filled and returned. The data collected through different instruments were analyzed both qualitatively and quantitatively.

On the one hand, the data that were collected from teaching and learning modules were analyzed using percentage to see the difference in objectives, contents, teaching and learning methodologies and evaluation techniques developed in the curricula materials, inline with the environmental Policy documents of Ethiopia. Similarly the data that were collected from trainees using questionnaires were primarily analyzed using percentage, mean and standard deviation. To see the statistical mean difference of knowledge, attitude and acquisition of skill scores among the trainees, one way ANOVA was employed for interval independent variable (age) and chi-square test was employed for independent categorical variables like sex and center of the training. The relationship between main dependent variables: environmental knowledge, attitude and skill of the sample trainees were analyzed using inter correlation matrix. All the necessary outcomes were calculated using SPSS packages.

On the other hand, data that were collected from interview, focused group discussion and observation were analyzed qualitatively and synchronized with the rest data according to their relevance. Data collected from interviews were analyzed by quoting the actual ideas of interviewees, while data from focused discussion were analyzed by paraphrasing the sayings of discussants. Data from observations were also analyzed how they were related to the actual training processes.

CHAPTER FOUR

4. PRESENTATION AND ANALYSIS OF DATA

This section of the study deals with presenting, analyzing and interpreting the information gathered from both primary and secondary sources. Trainees, facilitators, experts and catchment areas were primary sources while curricula materials were secondary sources.

4.1 Curricula Materials Employed by Agri Service Ethiopia

The main objective of this study is to assess the integration of environmental education objectives, contents, teaching methods and evaluation techniques into Adult Training Programs run by Agri-service Ethiopia. In this study the researcher has tried to analyze the teaching modules by categorizing environmental objectives, contents, teaching and learning methodologies and evaluation techniques in relation to the Environmental Education set by Ministry of Education and Environment Protection Authority. Although it is possible to integrate environmental issues in any subject (Filho, 1993), the present researcher has conducted his analysis on two modules (family planning and conservation of natural resources: soil and water) as these are the main current training modules. As it is stated in the Education Policy of Ethiopia, in the Environmental Guideline of Ethiopia and in EPA, the environmental education of the country should consist of environmental objectives, contents, teaching methodologies and evaluation techniques (FRDE, 1994; MOE, 1994; EPA, 1997).

4.1.1 Environmental Education Objectives developed in the teaching modules.

The categories of Environmental Education Objectives as stated in the Environmental Education Guideline (MOE, 1994:11) are: knowledge, attitude and skill.

Hence, one of the research questions raised: How environmental education objectives and contents were addressed in teaching and learning materials of Adult - Non-Formal Education? to assess whether these environmental education objectives are translated into adult-non formal teaching modules, entitled "The family planning" and "Conservation of Natural resources".

Table 4.1.1: Objectives developed in the Modules

Course	*Total Objectives*	*E.E objectives developed in the total objectives*					
		Knowledge		*Attitude*		*Skill*	
		F	*%*	*f*	*%*	*f*	*%*
Family Planning	26	6	23%	1	3.8%	0	0%
Conservation of Natural Resource	14	10	71.42%	0	0	4	28.57%

Table 4.1.1 above depicted that, the first module "Family Planning", inculcated 23% of environmental knowledge objectives, 3.8% environmental attitude objectives and it did not incorporate environmental skill objectives. The second module conservation of natural resources incorporated 71% of knowledge and 28.57% of environmental skills without giving attention to attitudinal domain. The same revealed that the integration of environmental attitude and skill in the two modules seemed to be neglected. When we see "family planning", only 23% of the knowledge area is integrated in the course, though it has a better position compared with Attitude (3.8%) and skill (0%).

In general unlike the environmental education objective developed in our policies, both modules depicted that environmental attitude and skills are neglected. In "Conservation of Natural Resource Modules" the knowledge aspect of environmental objectives (71%) was found incorporated without giving any attention to attitudinal changes of learners' behavior. The objectives developed in the modules deemed that the three domains of learning (cognitive, affective and psychomotor) were not given equal attention. The objectives developed in both modules relatively gave attention to the environmental cognitive domains. The affective and psychomotor domains were seen overlooked in both modules. This result seemed to contradict with the idea put in the strategic plan of ASE stated in the background.

If the modules were developed through participatory rural appraisal, and the ingenious knowledge and practices were encouraged, the affective and psychomotor domains could have been given due attentions. But, in contradiction to this idea, no significant attention was given to inculcate all domains as fairly as possible in the modules.

As to Blooms in Damitew (2007) and FDRE (1994) the three domains of learning should be given a relative emphasis in curriculum development. Further more, Palmer (1998) and Iverson (1976) in Melaku (1994) recommended that to bring the overall development of an individual ,environmental education knowledge, attitude and skill should be treated in an integrated manner in the teaching materials and these also be highlighted in a daily teaching learning activities.

In contradiction to the above mentioned idea, again less attention was given to inculcate all domains as fairly as possible in both modules. This looked like to agree with the idea gained from facilitators. One of the interviewed facilitators said "we try to base the modules and needs of the learners in teaching learning process. But I do not believe that we are checking how the three domains are maintained". As to the idea of Head Office training director, "the organization itself senses the problem of infusion, integration and mainstreaming of environmental education objectives in the disciplines especially for those areas, which do not directly address environmental issues". This idea seemed to be another witness why environmental education objectives in "Family Planning" were being only 23% affective domain and no psychomotor domain was observed in the module in comparison to "conservation of natural resource" in which 100% of objectives were environmental except that there was a big difference in three domains.

4.1.2 Environmental Education Contents

As it is stated in the literature review of this thesis, the first things considered as environmental education contents are empirical elements such as air, water, soil, vegetation, wildlife, energy, minerals, forests etc. Other major environmental issue such as land degradation, deforestation, loss of soil fertility, soil erosion, water (solid and liquid) Pollution, society interaction and relationship with environment are also included in empirical elements of environmental education contents.

According to UNESCO -UNEP (1985:127) and MOE, (1994:10), the second environmental contents are ethical elements in consuming, preserving and protecting the environment by solving environmental problems and conflicting issues due to interaction and interference of people with their environment. These are ethics needed for population control, ethics of having

value of clean and healthy environment, ethics needed to strike the balance between development and environmental exploitation and ethical consideration of having individual's responsibility for environmental welfare. Where as learning methods like learning by doing, touching, observing, appreciating and practicing are the third categories, aesthetic elements of environmental education.

In general the teaching modules were analyzed by assessing how far the main environmental education contents. /empirical, ethical and aesthetic elements/ were inculcated into these modules.

Hence one of the research questions raised: How environmental education objectives and contents were addressed in teaching and learning materials of Adult - Non-Formal Education?

Table4.1.2: Environmental Education Contents developed in the Modules

Course	Total contents	E.E contents developed in the total contents					
		Empirical		Ethical		Aesthetic	
		f	%	*f*	%	*f*	%
Family Planning	26(100%)	20	73%	0	0	0	00
Conservation of natural resource	95(100%)	36	37.89%	25	26.31%	30	31.57%

Table 4.1.2 revealed that 73% of the contents developed in family planning seemed to be environmental issues and 95.77% of the contents in "conservation of Natural Resource" are considering environmental issues. But when we see the content in relation to three elements, the module 'family planning' seemed not to reflect both ethical and aesthetic elements. In the development of the module, there seemed lack of identifying and integrating environmental issues and problems that are threatening for the present and future generation at local, regional and global levels. This showed that the material was not enough to boost the position of learners to be committed in any measures taken to family planning in relation to environmental problems. In addition to this, the module deemed to fail to absorb the attention of the adult learners since it was not organized in such away to make learners appreciate, love and feel about the environment which they live in. Because the aesthetic elements were found highly neglected

When we see the second module "conservation of natural resources" it seemed to be organized by considering environmental issues (95.77 %/). But the empirical parts like water, air, minerals etc. were well listed where as ethical elements in consuming, practicing etc of the environmental resources were poorly stated. In general in the second module the environmental contents like environmental problems, causes of environmental problems and in some extent measures to be taken in solving the problems were presented in detail as compared with the first module which lacks to clearly illustrate environmental issues.

It is widely understood and seen from practice that to achieve Environmental Education Objectives, it needs the choice of appropriate contents. In the integration of environmental contents all the elements of environmental education contents, empirical, ethical and aesthetic elements should be inculcated in teaching and learning modules (Palmer, 1998). As to Neal (1994) in Atilabachew (2007) and Palmer (1998) the three components of environmental education contents must be interwoven during the development of teaching and learning materials and in the actual learning and teaching processes so as to develop learners' knowledge, attitude and skill. But in contradiction to these ideas, the contents developed in both modules relatively focused on empirical part of the content.

4.1.3 Teaching Methodologies developed in Modules

Some of the effective teaching methodologies, to achieve environmental education goals are:- outdoor methods, affective teaching method (value clarification, role-playing, simulation etc), case study method, community resource use (ecological, issue related to human resources) and Problem-solving (methods of autonomous learners and group enquiry) (MOE, 1994: p.63).

Hence the second research question raised: How environmental education methodologies had been integrated into the curricula materials? The table below shows how environmental teaching methodology was integrated into the two modules.

Table 4.1.3: Teaching Methodologies developed in the Modules

	Total methods used in the material	Integration of E.E methodologies				
		a	*b*	*c*	*d*	*e*
Family Planning	67	0	41(61.19%)	0	0	6(8.9%)
Conservation of natural resource	87	1 (0.01%)	56 (64.36%)	3 (3.52%)	2 (2.35%)	24 (27.86%)

Key: a=outdoor education

b = simulation

c = case study method

d = community resource use method

e = problem solving method

Table 4.1.3 revealed that outdoor method seemed to be neglected in modules, 0% and 0.01% for the first, "Family planning" and the second module, "Conservation of natural resources" respectively. Case study method and the method of using community resources were not addressed in the module, "family planning". These methods deemed to also be given less attention in the second module. As it can be seen from the same table, both two modules seemed to focus on clarification and simulation method i.e.,(61.19% for the first and 64.36% for the second module) .

The module "Conservation of Natural Resources" relatively looked like to give more attention to problem solving method. Another strong side of this module was that space was left for both trainees and trainers to address local environmental issues. That means when the trainees fail to solve the given problems, at least three trials were recommended till expected outcomes are achieved. But the first module was found lacked all these methods.

Even though problem solving method is one of the main and appropriate environmental education teaching methods to address practical and real life problems (UNESCO-UNEP, 2000), other important methods like field visiting, case study, etc were omitted in the modules. This seemed made the modules insufficient to integrate environmental education methodologies to properly address environmental education objectives and contents.

This part seemed to contradict with the idea of experts and most facilitators. They confirmed that at least one period among three was given to the field trip and practical exercise in the catchments areas. But if this method is not clearly addressed in to the modules, how can one be sure that all facilitators use this method properly? How can even the evaluation be conducted regarding the methodologies (outdoor, case study) as long as they are omitted in the modules? Hence, even if the facilitators have been used these methodologies in a fragmented way, the practice deemed to lack systematic methods in addressing these methodologies.

The teaching methodology of environmental education normally emphasizes the real environment through first hand experience. According to Environmental Education Guideline (MOE, 1994), the facilitators should have a competency to "select effective instructional methodology, which are appropriate for desired cognitive, affective and psychomotor domain outcomes, learner characteristics and available facilities (e.g. time, money, personnel)" (P.63). This shows the fact that the three component of environmental education should be interwoven in the development of modules and in actual teaching and learning process, so that the learners can acquire the right knowledge, attitude and skills. But in contradiction to the above ideas, the teaching and learning process were found fragmented and unsystematic.

4.1.4 Environmental Education Evaluation Techniques

As it is already stated in the literature review part and in Environmental Education Guideline (MOE, 1994) evaluation in environmental education should focus on three key dimensions of learning: affective, cognitive and behavioral area of development.

Hence, the second research question raised: How environmental education evaluation techniques had been integrated into curricula materials?

Table 4.1.4: Evaluation Techniques developed in the Modules

Modules	Total evaluation items developed in the modules		Evolution items help to evaluate environmental					
			Knowledge		Attitude		Skill	
	F	%	f	%	f	%	f	%
Family Planning	34	100%	15	44.11	0	0	0	0
Conservation of natural resource	72	100%	50	69.44	5	6.94	17	23.62

Table 4.1.4 showed, the evaluation items developed in the two modules seemed to have seen focusing on helping the learners to recall, repeat, explain, state, and define etc what they have learned.

In the first module 'family planning' evaluation techniques for attitude and skill acquisition were found totally neglected. Learners were not to be evaluated in application, analyzing, synthesizing or in some other things that helps them to change their attitude and improve their environmental skill. Although the second module entitled as "conservation of natural resources" was seen giving more attention to knowledge evaluation (69.44%) and relatively less attention to skill evaluation (23.62%), evaluations regarding attitudinal changes of learners (6.94%) seemed totally overlooked.

As it was already stated, the majority of evaluation items developed in the modules focused on facts that might be memorized. In the first module entitled as "family planning" even evaluation items for memorization were not stated (put) clearly. It simply says "Trainer asks targeted questions to trainees in order to evaluate" (ASE, 2003:16). This statement does not show what to evaluate and how to evaluate trainees' performance and position.

But in the second module entitled as "conservation of natural resource" evaluation items were clearly stated, though they tend more to evaluate learners' ability to memorize and recall what they have learned. For example, it says "let the trainees list and explain the various methods of control of wind erosion, ask trainees to explain tillage practice and various activities in the practices and let the trainees describe how and when emergency control measures are applied to control wind erosion ...etc" (ASE, 2001:21). As it is stated in the literature part, since educational objectives aim at producing selected desirable behavioral charges of learners, then evaluation is really the process of determining the degree to which these changes are taking places. But the evaluation techniques developed in the two modules were found to fail to evaluate the desired behavioral changes of the trainees.

According to UNESCO (2000), and Rush et al (1999), all environmental objectives, teaching methods and evaluation techniques should not only be focused on cognitive domain but also on the psychomotor and the affective domains. It is further stated that if learners are expected to

play their active role in utilizing and protecting their environment, the contents of the curricula materials should be integrated with environmental problems like green house effect, acid rain, ozone depletion, deforestation and waste disposal and issues like legislation, incentives, exploration and invention etc to inculcate positive values in their mind. But, in general the modules seemed insufficient to integrate environmental education objectives, contents, teaching methodologies and evaluation techniques holistically. The modules deemed to concentrate on the knowledge part even this by itself was not organized systematically in both modules. One of many reasons might be because of missing of the contribution of environmental education experts in the formal system (ICDR experts, MOE experts, EPA experts etc), in sharing their expertise and choosing the right model to integrate environmental issues into teaching modules. The idea claimed by training director that ASE has no any relationship with those bodies could confirm the above findings. He said "we as an institution have very limited communication with woreda Education Office and we have no any communication with EPA at large. But our strong relation to Ministry of Agriculture gave us advantage to inculcate social environmental problems in our training programs".

In summary, the above findings seemed to oppose the idea of most scholars who have strong beliefs in the integration of E.E issues in to all disciplines (Palmer, 1998; Allman et al, 1982 and Melaku, 1994). For instance, Palmer (1998) in his model of planning and implementing environmental education, underscored that environmental education knowledge, attitude and skill are inseparable and should be given relative attention in curricula materials. He also accentuated that the three component of environmental education: ethical, empirical and aesthetic elements should be integrated in the planning and implementing of curricula materials. The Environmental Education Guideline also highlighted that the major goal of E.E is attitudinal change since values are derived from it, and hence, curriculum developers should be aware of this in curricula development (MOE, 1997). But as it was discussed above, the three components were not well synchronized in the modules.

4.2 Learners' Environmental Knowledge, Attitudes and Skills

The main objective of this study is to assess the integration of environmental education objective contents, teaching methods and evaluation techniques into Adult Training Programs run by Agri-servic in relation to environmental knowledge, attitude and skill of the trainees. Each domain is discussed a follows.

4.2.1 Trainees' Environmental Knowledge

One of the main research questions raised: What was the level of environmental competence of the trainees in relation to knowledge, attitude and skills?

Table 4.2.1.1: Test Results with respect to the Performance Standard at 60% correct level

Training Centers	Total trainees who took the test- according to their sex		Accepted performance (Trainees who achieved the stand and above)		Unaccepted Performance (Trainees who achieved bellow the standard)		Mean scores	Standard Deviation
			f	%	f	%		
Alusha	35		22	62.9	13	37.1	62.39	3.388
Zimbitit	26		21	80.8	5	19.2	72.89	3.536
Gunaguna	22		20	90.9	2	9.1	70.22	1.677
Dibo	32		22	68.8	10	31.2	65.98	3.819
Sholla (5)	39		32	82.1	7	17.9	69.22	1.636
Total	M	82	70	85.36	12	14.64	70.56	2.029
	F	72	47	58.33	25	41.67	64.50	3.759
	T	154	117	75.97	37	24.03	72.10	2.810

Table 4.2.1.1 depicted that 117(75.97%) of sample trainees have passed the test. Where as 37(24.03%) of trainees sample have got scores below the standard level, meaning that, they have failed the test. When we see the trainees separately, trainees in Gunaguna center seemed to have got better performance (90. 9%) when compared with others and Sholla is in a second position (82.1%) and Alusha with accepted performance of 62.9 % is in the last position. In general it seemed that the majority of samples trainees that is 117 or 75.97% have displayed an acceptable performance as far as the test is concerned.

Environmental knowledge is very significant for trainees to have a healthy interrelationship between people with their environment. For sound environmental decisions at least basic knowledge of the environment is very essential (Fortner, 1978; Ramsey & Rickson, 1976 in Melaku 1994). Therefore, the achievement of the trainees' environmental knowledge seemed to be promising.

Table 4.2.1.1 also depicted that there was a light difference in knowledge of trainees between centers. The mean level of Alusha, Dibbo, Gunaguna, Sholla and Zimbitit are 62.39, 65.78, 70.22, 69.22 and 72.89 respectively. This seemed to show there was a slight mean difference among the training centers. From the standard deviation again one can at least estimate how well or poorly the means represented the distribution of the test score.

Taking the coefficient of variation in to consideration (32.25%) it seemed that there was greater dispersion in the distribution of test score of Dibo where as the dispersion of score of trainees in Sholla(r= 13.13%) and Gunagunal (13.26%) have been seen to be less as compared with others . However, one can not fully rely on the above statistical tools to show knowledge difference among groups. For instance, both the standard deviation and the mean can be affected by extreme scores. Moreover, the difference among the mean, even though the difference is little, might be due to errors in sampling the target population. As a result Chi – square test was employed to examine whether the obtained difference between the means was likely to have resulted from Chance.

Table 4.2.1.2: Chi –Square test for Knowledge, Attitude and Skill mean difference between different centers at P<0.05)

Domains	Chi-square (x^2)	Df	mean	sd. deviation	Sig (2 Sided)
Knowledge	90.797	60	72.10	2.81	0.006
Attitude	118.28	76	17.47	4.13	0.001
Thinking Skill	213.359	136	46.075	8.49	0.850
Action skill	14.892	1	45.745	8.5	0.000

The chi-square (x^2) in Table 4.2.1.2 above showed that the difference between means of the five centers regarding the knowledge test was not attributed to sampling error(o.006<0.05) .In other words the table revealed the existence of statistically significant difference between the mean test scores of the trainees.

In general, the trainees in Gunaguna and Sholla relatively deemed to be in good position in their knowledge as compared with other centers. This might be due to different factors. For instance Gunaguna center is located nearer to four catchments areas than other centers. This site is also near to Yekandach where intensive land resource conservation was taking place. It is expected that the afforestation, terracing and other relevant practices could have contributed for trainees' knowledge. From the interview point of view the facilitator of the some center tried to explain the objectives and methods of training in a better way as compared with the other three. Of course the facilitator of Sholla was not interviewed. Although it needs further study the difference might be due to the area in which the facilitator is graduated (in this case Agro-forestry which is more related to E.E). The same facilitator explained that he has got different short term trainings regarding conservation of natural resources and social problems of the community.

When we investigate the test results with respect to sex it is also observed from the Table 4.2.1.1 that males seemed to have achieved better score. That is 85.36 % of sample trainees of male have scored the standard and above, while females (58.33 %) have got score the standard and above. That means 41.67 %, almost nearly half of females failed to score above the standard.

As can be seen from the Table 4.2.1.1 above again there have been mean differences between male and female trainees, with mean sore of 76.56 and 64.60 for males and females respectively. Taking the coefficient of variation 15.97 % and 32.37 % for males and females respectively, it seemed that there was a greater dispassion in the distribution of score of females. However with similar reason as stated in case of training centers or since mean and standard deviations are susceptible to extreme scores, one can not be dependent on these test tools to see the mean difference. In other wards this might not tell us whether this difference was statistically significant. Therefore total achievement test for each male and female trainee was computed with higher statistics. In this respect chi-square test was employed to examine whether there was significant difference in knowledge of male and females. Since sex is a categorical variable chi-square test was chosen here.

Table 4.2.1.3: Chi-square test for Knowledge, Attitude & Skills between Male and Female trainees at $p<0.05$

Dependent Variables	Value of Chi-squares (x^2)	d.f	Sig (2 side)
Knowledge	27.530	15	0.025
Attitude	19.093	19	0.0045
Environmental thinking Skill	35.892	34	0.380
Environmental action skill	8.379	1	0.292

As can be seen from Table 4.2.1.3, there was significant difference between the environmental knowledge of males and females (.025<.05). This implied male achieved better than females. In addition to this, females' participation has been seen generally lower than that of males in group discussion. Specially in questions which need relatively basic environmental knowledge for which female and male trainees were requested to differentiate, like local, regional and global environmental issues, male trainees have been seen being in a better position than female trainees . This result agrees with the findings of Arcury (1990).which indicated that males have displayed better environmental knowledge than females. According to Betterham et al (1992) males are also proved to be in a better position than females regarding environmental issues.

The third independent variable concerned environmental knowledge in this research was the age difference among trainees.

Table 4.2.1.4: ANOVA Summary by Age at p<.05

Variables	Source	SS	df	Ms	F	Sig.
Knowledge	Between groups	15.365	4	3.84	0.419	0.795
	with in groups	13.66.174	149	9.169		
	Total	1381.539	153			
Thinking Skills	between groups	217.009	4	54.42	0.276	0.893
	With in groups	10344.316	149	72.335		
	Total	10561.324	153			
Action skill	between groups	0.231	4	0.058	1.240	0.297
	within groups	6.849	147	0.047		
	Total	7.050	151			
Attitude	Between	19.153	4	4.788	0.750	0.01
	With in group	2532.29	149	17.344		
	Total	**2551.444**	**153**			

Where: SS = some of scores
df = degree of freedom
Ms = mean of scores
F = f- ratio and
Sig = significant difference

As shown in Table 4.2.1.4 the age difference was tested using one of the higher statistic one way ANOVA, and this revealed that there was no significant knowledge difference between different age groups(.795>.05). This result seemed to agree with the idea of Aklilu (2006). For him age is one of the inconsistent variables having low effect on environmental knowledge, attitude and skills.

4.2.2 Trainees' Environmental Attitudes

As it is stated in the literature part of this thesis, development of attitude of learners toward their environment is the concern of ethical element of environmental education (E.E for the environment).In the same manner increasing knowledge alone will not significantly change attitude that leads to concerted action- knowledge for the environment. That is why the formation of positive believes, attitudes and values concerning the environment is becoming an increasingly important part of the environmental education program (MOE, 1994; UNESCO-UNEP 1985; Melaku ,1994). The Methodological Guideline for Environmental Education in Ethiopia noted that "the major goal of environmental education instruction should mainly be concerned with attitude formation through awareness, appreciation and action "(MOE 1994:22).

Hence, one of the research questions also raised: What is the level of environmental competence of the trainees in relation to their attitude?

Table 4.2.2.1: The Attitude of Trainees towards the Environment

Items		Favorable attitude		Neutral Attitude		Unfavorable Attitudes		mea	Standard Dev
		f	%	f	%	f	%		
P1		11	7.14	6	3.9	137	88.96	1.29	0.739
P2		17	11.04	5	3.25	132	85.71	1.52	7.63
P3		7	4.54	4	2.60	143	92.86	1.125	0.39
P4		5	3 .25	3	1.95	146	94.80	1.12	0.587
P5		55	3 5.71	3	1.95	96	62.34	2.20	1.281
P6		53	34.16	3	1.95	98	63.89	2.07	1.228
P7		42	27.27	4	2.68	108	70.05	1.90	1.118
P8		32	49.44	4	2.68	118	52.88	1.92	1.175
P9		79	51.30	5	3.25	68	45.45	2.49	1.281
P10		27	17.53	4	2.68	123	79.79	1.72	1.006
T	M	16	19.51	2	2.44	64	78.05	17.21	4.468
	F	15	20.85	3	4.17	54	75	17.73	
	T	31	20.13	5	3.25	118	76.62	17.47	

Key: see appendix I part I for items P1- P10

Table 4.2.2.1 above portrayed that most of the trainees were found having unfavorable attitude to ward their environment, which means 76.62% of the sample trainees were found having unfavorable attitude towards their environment. As it is already stated the mean score of learners for unclear stand is 2.5. If the total sum of trainees response add up to give more than 25 (with average level greater then 2.5) then it was agreed that their attitude was favorable. On the other hand if the total sum add up to give less than 25 (with average level less than 2.5) then it was agreed that their attitude was unfavorable .

As can be seen from Table 4.2.2.1, the attitude of trainees towards environmental issues was not positive for almost all items (with a mean of 17.47 which is less than expected average, 25). Table 4.2.2.1 also revealed that only 3.25 % of sample trainees deemed to accept the environmental degradation due to the unwise use of the environment by mankind and 92.54% of them want to give the responsibility of protecting the environment to other bodies. .Others (85.71 %) believed that the balance of nature is not easily upset. This last concept might be connected with other beliefs. They might believe that upsetting the balance of nature is supper natural.

Though the difference is little, female trainees (20.83 %) were found having more favorable attitude to their environment than male trainees (19.51%). Moreover, the same table showed that most of the trainees (76.62%) tended to have no favorable inclination towards their environment and 3.25% of them have no clear position towards their environment too. The results shown in the Table 4.2.2.1 above are not in contradiction with what the researcher observed in the teaching modules. The researcher observed that the approach of the modules to environmental education seemed relatively inefficient in developing trainees' attitude. Evaluation of trainees' attitudinal position to their environment was also seen falling in problem during the focused group discussion and interviewing key informants.

Above all the above result can not be strange for many researchers. Having better knowledge in an issue is of course usually expected to result in good attitude towards the same issue. The result in this research regarding attitude seemed to oppose the above idea. But scholars, like Aklilu (2006) seem to agree with such out comes. As to Aklilu (2006) this is not surprising as there have been a lot of research findings showing poor relationship between environmental knowledge and attitude.

To have a clear understanding of the difference between male and female trainees the mean standard deviations for items were computed (Table 4.2.2.1), and again to cheek whether these difference were statistically significant, chi –square test for male and female, as these are categorical independent variable, was employed (Table 4.2.1.3). As can be seen from Table 4.2.1.3 the difference in attitude between male and female trainees was statistically significant. That means female trainees have stronger desirable attitude than males, even though both males and females are below expected favorableness. This result seemed to agree with the idea of some scholars. Fore instance, Tarrant and Cordel (1997) and Stern et al (1993) in Atlabachew (2007) reported that females manifest better environmental concern than males.

As can also be seen from Table 4.2.1.2, the attitude difference of the trainees at different training centers was statistically significant. This might be due to the knowledge difference between different centers. The effect of the age difference in trainees on their attitude was also tabulated in Table-4.2.2.2 below.

Table 4.2.2.2: The Attitude of Trainees towards their Environment by Age

Age interval	Accepted performance		Neutral position		Unaccepted performance		Mean	st. deviation
	f	%	f	%	f	%		
Below 18	0	0	0	0	2	100	1.85	1.880
18-27	4	11.76	1	2.94	29	85.30	1.72	1.100
28-37	7	12.72	2	3.64	46	88.64	1.71	1.027
38-47	8	19.05	1	2.38	33	78.57	1.78	1.280
Above 47	12	51.17	0	0	9	47.83	1.79	1.127

Table 4.2.2.2 showed that almost all trainees with different age groups seemed to have unfavorable attitude towards their environment. Trainees at age below 18(100%) seemed to be at the worst position with respect to attitude test as compared with other trainees of different age groups. That means, it seemed that adults have relatively favorable attitude as compared

with younger ones. For instance, trainees' positive attitude towards their environment was found to be increasing as the age of trainees increasing. This means that adults were found relatively in good position as compared with young ones. But the trainees above age 47 deemed to have irregular pattern in relation to environmental attitude. To check whether this difference was statistically significant one way ANOVA (as age is interval independent variable) was employed (Table -4.2.1.4)

Table 4.2.1.4 Portrayed that there was statistical attitude difference between different age groups (.01<.05).That means from the table younger learners deemed to have the most unfavorable attitude toward their environment as compared with adult ones. This result of course contradicts with the idea of Arcury (1990). For Arcury younger persons exhibit better favorable attitude than older ones. .

4.2.3 Trainees' Environmental Skill

One of the domains to be assessed in this study was the skill acquisition of the trainees. Hence one of the research questions raised: What was the level of environmental competence of the trainees in relation to acquisition of skills?

Table 4.2.3.1: Trainees' Judgments showing Their Environmental Thinking Skills

items		Accepted Performance				Neutral		Unaccepted Performance			
		Always		Usually		Some time		Rarely		Never	
		f	%	f	%	f	%	f	%	f	%
M 1		53	34.41	51	33.36	35	18.18	11	7.14	4	2.61
M 2		67	43.51	49	31.81	28	18.18	4	2.60	6	3.90
M 3		64	41.56	40	25.97	34	22.08	13	8.44	3	19.48
M 4		66	42.86	43	27.92	30	19.48	14	9.09	1	0.65
M 5		62	40.26	39	25.32	25	16.23	26	16.88	2	1.30
M 6		51	33.11	40	25.97	47	30.52	14	9.09	2	2.60
M 7		55	35.71	59	38.31	20	12.99	18	16.88	2	1.30
M 8		19	12.34	26	16.88	49	31.82	51	33.12	9	5.84
M 9		37	24.03	37	24.03	45	29.21	29	18.83	6	3.90
M 10		59	38.31	45	29.22	21	13.63	25	16.23	4	2.60
M 11		67	44.81	52	33.77	28	18.18	6	3.90	1	1.22
M 12		72	46.75	37	24.03	23	14.94	20	26.00	2	2.60
T	M	360	37.50	216	22.50	216	22.50	144	15.00	24	2.5
	F	316	37.05	268	31.49	172	20.16	76	8.9	21	2.46
	T	676	38.88	484	26.70	388	21.40	220	12.13	45	2.48

Key: see appendix I part II for items from M 1- M 10

Table 4.2.3.1 depicted that, 65.58 % of the trainees were found having acceptable degree of skill in environmental issues of which (38.88%) were having the most acceptable skills in favor of the environment. About 14.61 % of the trainees were having very little thinking skills about their environment. Very significant trainees fall in neutral position (21.40%) unlike the case of attitude discussed earlier. As observed from Table-4.2.3.1 above, the average trainees (57.41%) were found having acceptable skill in most of the items (75%). From computed Table 4.2.3.1, one can also see that 78.58% of trainees appeared to suggest that discussion about national environmental problems tend to be present adequately while only 29.22% of the trainees suggested that visiting other places to share important experiences tend to be presented adequately. But the majorities (70.18%) were in unfavorable positions to the same issue. This

last concept agrees with content analysis part that the outdoor teaching methodology was absent in the teaching modules. Similarly two of the interviewed facilitators tried to mention outdoor method of teaching in a fragmented pattern .One of them called it " field observation " and the other termed it as" field visit". Though the two terms seem the same the facilitators fail to name the technical term (outdoor education). The other two never mentioned it at all.

Next to discussion about regional environmental problems what the trainees seem to be familiar with was poverty reduction for which 75.32 % of the sample trainees have judged favorableness. This result seemed to agree with what was observed in group discussion. One of the group members stressed that "if we want to bring breakthrough of poverty reduction, family planning must get more attention than all other things". "**በድህነት ቅነሳ ላይ መሠረታዊ ለውጥ እናምጣ ካልን ቤተሰብ ምጣኔ ላይ አሁን ካለው በበለጠ መሠረት አለበት የሚል ሃሣብ አለኝ**" :: Another respondent in group discussion mentioned similar idea. He first explained himself as he was more impressed in poverty reduction than environmental protection. He said " **እኔም ሆንኩ ጉደኞቼ አካባቢያችንን ከምንጠብቅ ዛፎችን መንጥረን አርሰን እድገት ብናመጣ እንመርጣለን**" :: "All my colleagues and I prefer to bring development by expanding our farm land through deforestation from protecting our environment" .

The third issue what the trainee seemed to be familiar with was preservation of environmental degradation for which 74.02% of the sample trainees judged favorableness. This result seemed to agree with the ideas gained from both group discussion and interview part. The respondents in group discussion prioritized environmental degradation as a serious problem though they were not active enough to list other environmental problems related to degradation. They were also seen mentioning the terms with out any hesitation. The first respondent raised his hand and tried to list environmental problems as "Soil erosion, deforestation, absence of cut and carry system, early marriage." The second one again raised his hand and listed the problems as "Population explosion, soil erosion, deforestation, lack of reforestation and problems of implementing land use policy." And others tried to put "degradation" in their speech first. One of the program officers has confirmed that in need assessment processes farmers always mention soil erosion as their first environmental problem. He put his idea as "the core of our program is ANFE. And the locus of this program is to change attitude of the farmers. The methodology is based on the

problems selected by learners. What we observed here is that, the farmers set soil erosion as the major problem. That is why we developed this module 'conservation of natural resources: soil and water' as the major course".

This idea is almost similar to the idea gained from one of the zone agriculture and rural development expert. He stated "we have (both the zone & ASE) almost similar programs concerning the environmental problems. Some times we use training centers (FTC and COLF) interchangeably for demonstration purposes. Our farmers know that the very serious problem is environmental degradation".

In summary it can be observed that the greater number of trainees as compared with other responses, Judged that the activities existed adequately. According to UNESCO /UNHCR (1999) a positive attitude to environmental issues means developing a sense of commitment to care for the environment which leads to have a paramount skill. However in this research the presence of adequate occurrence of activities judged by trainees deemed to contradict with the low level of the present trainees' favorable attitude toward the environment. This might be due to many reasons. In one way, though the activities occurred most frequently as indicated by trainees, they might not be enough to change the environmental attitude of trainees. In another way the occurrence of the activities might be tending to develop trainees' knowledge rather than bringing about behavioral changes in attitude. However, what happened in this research might not be strange. As to Eyre (1989) in Asmare (2007) and UNNESCO-UNEP (2000) the most difficult problem in the implementation of an educations program is to maintain a positive relationship between the three learning domains: knowledge, attitude and skill. Having this in mind the favorable achievement judged by trainees (65.58 %) might be taken as encouraging. In addition since most of the activities are taken from the teaching and learning modules, the obtained result seemed to be encouraging as far as the trainees' judgments were concerned.

Table 4.2.3.1 also portrayed that, females about 68.46% seemed to have better thinking environmental skills than male trainees (60 %). That means female trainees seemed judged better favorable thinking in environmental issues and activities as compared with the male trainees.

Keeping this in mind, the present researcher strived to see if there was any significant difference in environmental thinking skills between male and female trainees by using chi- square test. As can be seen from Table 4.2.1.3, there was no significant thinking difference between male and female trainees. Thus females were not more skillful than males in environmental issues. This result deemed to disagree with the research finding by Kibert (2000). For her females have a significantly higher environmental skill than males .One problem which led the result to contradiction might be due to lack of questions that show difference between males and females. The researcher also tried to see the environmental thinking skill difference of trainees between training centers and ages in the following tables.

Table 4.2.3.2: Trainees' Skill Acquisition to their Environment by Age

Age interval	Accepted performance		Neutral position		Unaccepted performance		Mean	st. deviation
	f	%	f	%	f	%		
Below 18	2	100	0	0	0	0	3.75	0.707
18-27	22	70.96	3	9.68	6	19.36	3.83	1.190
28-37	30	53.57	9	16.13	17	30.35	3.67	1.027
38-47	26	61.90	8	19.05	8	19.05	3.58	1.280
Above 47	12	57.16	3	14.28	6	28.56	3.76	1.127

As can be seen from Table 4.2.3.2, youngsters (below age 18) seemed to be aware of environmental degradation as compared with older ones.. Having this in mind, the present researcher employed ANOVA test to see if there was significant difference with different age groups. Table 4.2.1.4 depicted that there was no skill difference between trainees at different age groups.

Table 4.2.3.3: Trainees' Acquisition of Environmental Thinking Skills by training Center

Training	Total Trainees who took the test	Accepted Performance		Neutral position		Unaccepted Performance	
		f	%	f	%	f	%
Alusha	35	23	65.72	4	11.42	8	22.86
Zimbitit	26	19	73.08	4	15.38	3	11.54
Gunaguna	22	14	63.63	6	27.27	2	9.10
Dibo	32	15	46.88	10	31.25	7	21.87
Sholla (05)	39	30	76.92	4	10.26	5	12.82
Total	154	101	65.58	28	18.18	24.25	16.24

Another factor expected to have an effect on trainees environmental thinking skill was the place were trainees conducting their training. As can be seen from Table 4.2.3.3 above there seemed that trainees in Sholla (76.92 % favorableness) were found having better environmental thinking skill as compared with other centers and Dibbo was at the least position (46.88%). Table 4.2.3.3 also revealed that trainees in Dibbo were (31.25 % of them) confused about the rate of the occurrence of environmental activities. In addition to this, trainees in Alusha, Zimbitit, Gunaguna and Sholla were above the average (65.58%). Where as, trainees' skill favorableness in Dibo was found to be below average regarding accepted environmental thinking skill. But, Table 4.2.1.2 also gave a picture that the observed difference between trainees of different centers was not statistically significant (Sig 0.850 > P= 0.05).

As it is already stated in the methodology part, the involvement of the respondents with real problems and issues was tested by yes or no. 7 items. As thinking skill difference between trainees with respect to training centers, sex and age was analyzed; their action skill difference with respect to same variables was also analyzed.

Table 4.2.3.4: Trainees Action Skill

Items		Accepted		Neutral		Unaccepted		Mean	St. Dev.
		F	%	f	%	f	%	-	-
S1		131	85.06	2	1.30	21	13.64	1.14	0.346
S2		125	81.17	2	1.30	27	17.53	1.18	0.383
S3		118	76.62	3	1.95	33	21.45	1.22	0.415
S4		58	31.66	2	1.30	94	61.04	1.62	0.486
S5		94	81.04	3	1.95	57	37.01	1.38	0.414
S6		94	61.04	5	3.25	55	35.71	1.37	0.492
S7		64	41.56	41	26.62	49	31.82	1.43	0.412
	M	614	70.89	28	4.79	142	24.32	1.52	0.423
	F	280	55.78	30	5.98	192	38.24	1.30	0.487
Total	T	694	63.90	58	5.34	334	30.16	1.33	0.457

Key: refer to appendix I part III for items S1- S7

Table 4.2.3.4 illustrated that majority of sample trainees (63.9%) deemed to have accepted performance in practical activities of environmental issues. The trainees' action skills seemed also to be in a good position in having toilet, terracing and practice of family planning. Figures4.2.3.1 -4.2.3.9 also could give a picture of what was happening on the farmers plot regarding terracing and reversing of gulley erosion. What has been shown in the demonstration site (fig 4.2.3. 2), seemed to be translated into each plot of the farmers (see fig 4.2.3. 1 and 4.2.3. 3 -7).

As can be seen from the figures trainees are not only trying to have terracing on the plots of land but also they have been seen growing variety of animal folder trees on the plots

Fig4.2.3.3 depicted that there is a translation of practical activities of trainees on their farmlands to others who are not part of the training.

As can also be seen from Table 4.2.3.4 above trainees seemed not good at feeding their livestock using cut and carry system (31.66%). This problem is underlined by all respondents during the study. One of the facilitators, for instance, said "my idea is that unless and otherwise land use policy is translated in to practice free grazing will never to be at end". Free grazing is seen here and there in all part of the area even, in the field of training areas (see fig-4.2.3.9) .Some key informants also agree with this problem. One of the training officers said the following about the trainees as "though some trainees tried to feed their animals by the method of cut and carry system, it would take long time to translate their practice into other farmers" .Even though, some farmers feed their animals with hay, straw, silage, mixed rations and sprouted grains and legumes as it was observed in group discussion too, others simply blames the state policy. In general it seemed that farmers were not having attitudinal change to their environment regarding fodder feeding even if some sorts of action skills are widely seen in practice.

Table 4.2.3.4 also depicted that trainees looked like to give less attention to fuel saving stoves (41.56%). The researcher tried to see the house of some key informants and many of them were found with out fuel saving stoves .Even some trainees, having fuel saving stoves, had been observed abusing the use of these materials. For instance, some trainees have been changed the use of fuel saving stoves to smokeless traditional ones. One of the key informants (the lady one) Claimed that "I simply changed the use of modern stove to smokeless traditional one because of the fear of the smoke .Of course I know that I can cook variety of foods at a time in fuel saving stoves". "ጭስ እያደናበረ ሰያስቸገረኝ በአንድ ጊዜ ብዙ ምግብ መሥራት እንደምችል ብረዳም ጭሱን ወደ ውጭ እንዲወጣ አድርጌዋለሀ"::

Table 4.2.3.4 also portrayed that the action skill of the trainees is below average (1.33<1.5) and male trainees (70.89%) seemed to have better practical activity than females (55.78%), but this difference was not statistically significant as can be seen from Table 4.2.1.3 (sig 0.292>0.05).

Table 4.2.3.5: Trainees' Action Skill by Training Center

Training Centers	Accepted performance		Neutral position		Unaccepted performance		Mean	Standard deviation
	f	%	f	%	f	%		
Dibbo	17	53.12	2	6.26	13	40.62	1.43	0.374
Alusha	26	74.29	1	2.86	8	22.85	1.24	0.382
Sholla	24	61.54	3	7.7	12	30.76	1.35	0.502
Gunguna	14	63.64	2	9.09	6	27.27	1.32	0.410
Zimbitit	17	65.38	0	0	9	34.62	1.34	0.475

Table 4.2.3.5 depicted that, trainees in Alusha(74.29%) seemed to have better skill acquisition as compared with other centers.. This difference was proved to be significant by using chi-square test (Table 4.2.1.2 (sig0.000 < 0.05)).One reason for this difference might be due to the trainees in Alusha are nearer to the town Mertolemariam than others. It is expected that dwellers nearer to the towns are suffering from the shortage of fuel wood and free grazing. It was also observed during the study that, nursery beds seemed to have been seen more in areas nearer to the town. This situation might take the trainees into practical activities to alleviate their environmental problems. In general the mean score of the trainees in all centers was found below the average (1.5).That means trainees were not found at encouraging position of practical skill.

4.3. Relationship among the Trainees' Environmental Knowledge, Attitude and Skills

The study attempted to answer one of the research questions: Was there any relationship between the trainees' environmental knowledge, attitudes, and skills? Thus, to examine this situation inter-correlation matrix was employed

Table 4.3.1:- Inter-correlations of knowledge, Attitude and Skill (N=154) at 0.05 level (2-tailed)

Correlations	Knowledge	Attitude	S1	S2
Knowledge	1			
Attitude	0.098	1		
Thinking skills (s_1)	0.182	0.217	1	
Action skill (s_2)	0.226	0.109	0.827	1

As it was stated in the literature review of this thesis, a correlation coefficient describes the extent to which points of two different variables are dispersed. As the point disperse away from a linear relationship the correlation is said to be weaker and conversely as the point cluster closer to a straight line the correction is said to be stronger (Hinton, 1995 in Kibert, 2000). All correlation coefficients return a value between-1and1 .The sign of the number indicates the slope of the line. The correlation 0 indicates that there is no correlation between variables at all. A correlation of 1 regardless of sign indicates that there is a perfect correlation between the variables. According to Azjen and Fishbein (1980:99) in Kibert (2000:40), in social sciences, correlation less than 0.3 shows weak relation, correlation between 0.3 and 0.8 shows moderate correlation and correlation greater than 0.8 shows strong relationship between two variables.

As can be seen from Table 4.3.1 above, thinking skill (s1) and action skill (s2) were found highly corrected with correlation coefficient of 0.827. Know ledge and attitude seemed to have very weak correlated (r = 0.098).The correlation between knowledge and skill and between attitude and skill were very weak i.e. the correlation between knowledge and action and thinking skill were 0.226 and 0.182 respectively. These correlations are much more less that 0.3 and the correlation between attitude and action and thinking skill were 0.109 and 0.217 respectively which show also very weak correlations between variables. Thus learners' environmental knowledge accounted only 3.3 %, and 5.1% for variations of learners thinking skill and action skill respectively. These results are in line with those reported by authorities mentioned in the literature review part. Therefore these patterns of correlation revealed that the teaching and learning situation need some improvements. According to Keach (1979) sound knowledge about environment and favorable environmental attitude leads to mental and action skills in one's daily life .Keach further paraphrased similar ideas as "in the absence of a sequence activities leading from awareness to the action stage much of the effectiveness of an environment program is lost ." (p.5)

CHAPTER FIVE

5. SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

The study was intended to assess the integration of environmental education in to adult non-formal education. To this end the following basic questions were raised:

1. How environmental education objectives and contents were addressed in teaching and learning materials of Adult - Non-Formal Education?
2. How environmental education methodologies and evaluation techniques had been integrated into the curricula materials?
3. What was the level of environmental competence of the trainees in relation to knowledge, attitude and acquisition of skills?
4. Was there any relationship between the trainees' environmental knowledge, attitudes, and skills?

In order to answer the basic questions and achieve the intended objectives, review of literature related on environmental problems, environmental education and its practice was made and findings on environmental education knowledge, attitude and kills were also assessed. To collect relevant data from teaching and learning modules checklists were prepared, categories were developed and units of analysis were determined for content analysis. On the other hand to collect data from the trainees, criterion referenced test, attitude scale, rating scale for thinking skill acquisition and checklists to investigate action skill, were developed and employed. To triangulate the information, data from experts, facilitations and key informants were collected through interview. In addition to this, catchment areas and some selected plots of land of the trainees were observed using the developed checklists, and focus group discussion was also conducted.

Among seven training centers run by Agri –Service Ethioppia in East Gojjam, one of them was selected for pilot test and the other five were randomly selected for the purpose of the study. Among 306 trainees in the sampled training centers 154 or 50% were selected using systematic sampling. For interview case, two Zone Agriculture and Rural Development Department experts,

two program experts from the Training Office and one program director from the Head Office of ASE, were selected purposefully. The interviewees were selected based on their role in Adult Non- Formal Education Program run by Agri service Ethiopia and the director was selected simply as he was the only program director at the Head Office .Four facilitators were randomly selected for interview. Thirty percent of catchment areas were randomly selected and observed.

All the secured information were organized and analyzed against the main dependent variables: environmental knowledge, attitude and skill of the trainees. Percentage, mean and standard deviation, chi-square test and one- way ANOVA were employed for the purpose of data analysis. Inter- correlation test was finally employed to see the inter- correlations of the main dependent variables. Data from interviews, observations and focused group discussion were qualitatively analyzed and synchronized with the other (quantitative) data according to their relevance.

The major findings of this research paper revealed that the objectives of the modules were found more inclined to imparting cognitive domains (47.21% on average). The affective domains were largely found overlooked (only 1.9% of the objectives were to reflect affective domains). As long as the contents were considered they were found having shortage of ethical elements(only 13.15% of the contents were consisting of ethical elements) .This means that the modules were not enough to develop and bring about the attitudinal change of trainees to be committed towards protecting their environment .The empirical element (education about the environment) were found having better position as compared with ethical and aesthetic elements(i.e. 55.44% of the contents were found empirical ones).

Regarding the teaching and learning methodologies developed in the modules, the out door and case study methods were found almost absent. That seems why the trainees tended to lack action skills. As far as evaluation techniques were concerned the module were found having more inclination to evaluate knowledge as compared with the attitude and skill of the trainees. In general, it was found that the elements found in the teaching and learning modules had no power to measure up to the elements and standards of the present day environmental education set by Ministry of Education and EPA. Rather they appeared unfussy and speculative in nature.
The majority of the sample trainees displayed mastery of environmental knowledge as far as the achievement test result was taken into consideration. That means 75% of the trainees passed the

test. In the testes male trainees were found having better environmental knowledge than female trainees. From the achievement test significant knowledge difference was also observed between training centers. But the difference between knowledge of sample trainees with respect to their age was not statistically significant.

Regarding the attitude of the sample trainees, the vast majority of the trainees exhibited undesirable attitude toward their environment (76.62%) but female trainees were found more concerned than male trainees. This result revealed the reality because attitudes take time to nurture and environmental literature is not a short course (Melaku, 1994; Kibert 2000). Secondly this result also agreed with the content analysis part in this research. In the teaching and learning modules, affective domain was not properly treated.

Regarding trainees thinking skill, relative majority of the trainees were found having this skill (65.58%). Nevertheless more work appears to be important in this area .Because the available information and findings alone are not complete enough to provide incontrovertible results. Because, trainees having very limited attitude towards the environment are not expected to have sufficient environmental skill (Kibert 2000) .Slight majority of the sample trainees were also found having environmental action skill. Thinking skill differences between male and female and between different training centers and age groups were found insignificant .But there was significant action skill difference between different centers.

The correlation among knowledge, skill and attitude were very weak. Knowledge as a predictor was found contributing very few percentages for variation of learners' skills. Besides, knowledge and attitude were poorly correlated (r=0.098). These findings are in general against the present hypothesis as well as results from other environmental literacy studies recounted in the literature review, because in most researches, at least moderate relationship is expected between attitude and skill.

Finally, the professional contribution of experts from different institutions (EPA, ICDR, MOE, etc) was found insignificant, because ASE was proved having little relationship with these bodies.

5.2 Conclusions

Based on the findings of the study, the following conclusions were drawn:

The research has come up with mismatching results among the three domains: environmental knowledge, altitude and skill regarding the curricula materials. There were adequate and relevant cognitive issues addressed in the teaching and learning modules while, the affective and psychomotor domains were found overlooked. The research findings also revealed that ethical elements of environmental issues were neglected in the curricular materials. In addition to this, the research findings made clear that the teaching methodologies developed in the curricula materials were found lacking outdoor and problem solving methods. The methodologies were not also open enough to give gaps to make the teaching and learning processes indigenous. This implies that it needs considerable efforts to translate environmental issues integrated in our policies to the present curricula materials and the teaching and learning processes.

The research findings also revealed that the trainees were found having unfavorable attitude towards their environment. In addition to this, the action skill of the trainees was found below average. The study also made clear that there was very weak relationship among the main dependent variables: knowledge, attitude and skill and it finally showed that there was no any linkage between ASE and EPA in development of curricula materials. This seems to lead to a greater demand of cooperation of stakeholders to integrate EE into the programs run by ASE as the changing of behaviors of learners positively toward their environment needs the involvement of different concerned bodies for its accomplishment.

5.3 Recommendations

In line with the findings of this study, the present researcher has made the following recommendations:

1. The sample organization (ASE) needs to consider, to revising the present curricula materials and organize them in such a way that their objectives and evaluation items inculcate all the domains as fairly as possible.
2. In addition to objectives, contents and evaluation techniques, teaching methodologies need to be revised so that they integrate practical problem solving methods,

3. In the revision of curricula materials, the ethical and aesthetic elements of environmental issues needs to be given due attention, as the education for the environment is the most important part of environmental education.
4. Although it is a bit an easy task to ingrate environmental issues into those subjects directly related to environmental problems, multidisciplinary integration method should be given due consideration in those areas which are far from environmental education in nature.
5. The researcher recommended that the sample organization, ASE, consider providing the facilitators with enough information and proper guidance in developing teaching techniques for improving the environmental aptitude and skill of the trainees.
6. The study made clear that there was very weak relationship among the main dependent variables: knowledge, attitude and skill. Hence, the researcher recommended the sample organization to realize the need to treat these variables in an integrated and evenhanded manner both in the curricula materials and teaching and learning processes.
7. The Environmental Protection Authority (EPA) should take the greatest responsibility in supporting the stakeholders, especially those who directly involved in addressing environmental issues. Hence it is recommended that EPA needs to have a great linkage with ASE as the latter one runs Adult- Non Formal Environmental Education programs.
8. The researcher feels that the issue of integrating environmental education into non formal adult education system has been overlooked. Where as, in Ethiopia, environmental problems can not be solved only by giving awareness to those bodies who are in formal education systems. Unless people from all corners of the land, have deep understanding, involving in various decision making processes, the problem will continue even more severely than before. Hence, the researcher recommended EPA, MOE, ASE and other NGOs to work in cooperation to ensure that every one is outfitted with required environmental knowledge, attitude & skill, through both formal and non formal means of awareness creation.

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Appendix I Questionnaires

Addis Ababa University

School of Graduate Studies

The aim of this questionnaire is to collect relevant data on the integration of environmental education into Adult- Non-Formal education programs.

The data will be used for a research purpose. The information from respondents will be confidential and well be used for the intended purpose only. Your honest response will be highly appreciated. Please do not write your name.

Thank you very much!!

Part I: Biographical Data

Instruction- Please indicate your answer by putting a tick (✓) mark in the box provided.

1. Name of your training center.....

2. Sex:

a. Male ☐ b. Female ☐

3. Age:

a. Under 18 ☐ b. 18-27 ☐ e. above 47 ☐

c. 25-37 ☐ d. 38-47 ☐

Part II: Attitude Inventory

Instruction: put tick (✓) mark under strongly agree (A) agree (B), disagree (C) or strongly disagree (D) to show your position about the ideas contained in the following statements.

No	Items	Scale			
		A	B	C	D
A.	**Environmental problems**				
1	In my view mankind is more severely abusing the environment than other living things				
2	In my view the balance of nature is easily upset				
3	In my view everybody is responsible to protect his or her environment				
4	In my opinion the human attitude about the earth must change from one of "use and abandon" to one of "wise use and preservation" of support system.				
5	As to me human beings are natural part of the environment and are capable of preserving or destroying earth				
6	The population explosion and unrestricted human use of resources pose a threat to all natural resources				
7	Science and money will not solve environmental problems without modifying the attitude of people				
8	In my view every person can contribute to society by employing individual talents and skills.				
9	In my view irrigation, drainage, and vegetation can bring some additional land into useful production.				
10	In my view population growth and mankind's tremendous use and misuse of energy are primarily responsible for today's more serious environmental problems.				

Part III: Rating Scale

Instruction One: Thick (✓) in the adjoining columns to show how often the following environmental education activities occur in your training processes.

1. Never 3. Sometimes 5. Always
2. Rarely 4. Usually

No	Item	1	2	3	4	5
1	Issues to control population growth					
2	Poverty reduction					
3	Management of natural resources					
4	The use of terracing in reducing soil erosion					
5	Afforstation program					
6	Life stock management					
7	Preventing environmental degradation					
8	Visiting other places to share important experiences					
9	Group works in teaching rooms					
10	Discussion about global environmental problems					
11	Discussion about national environmental problems					
12	Discussion about environmental problems in your Woreda and Kebele					

Thank you very much

Instruction Two: After reading the following items, put (✓) mark below 'Yes' or 'No' according to your position to agree or disagree.

No	Item	Yes	No
1	Do you have your own toilet?		
2	Is there a terracing on your own plot?		
3	Do you use cut and carry system to feed your domestic animals?		
4	Do you have your own nursery beds?		
5	Do you use family planning?		
6	Do you use communal wastage depots?		
7	Do you use fuel saving stoves?		

Appendix II: Achievement Test

Instruction: Choose the best answer for the following questions and circle the best answer from the alternatives given.

1. The most serious environmental problem in your kebele is

   a. Water pollution c. Soil erosion

   b. Air pollution d. None

2. Whom do you think is the most responsible one to solve environmental problems in your local area?

   a. The government c. Every citizen

   b. NGOs d. The rich

3. Which of the following natural resources is non-renewable?

   a. Wild animal c. Vegetations

   b. Minerals d. Soil

4. Which of the following is the cause of food shortage?

   a. Soil erosion c. Poor resource management

   b. Population explosion d. All

5. Population explosion is a serious problem for our environment because

   a. Resources on earth are limited

   b. People use resources effectively and wisely

   b. People would like to conserve resources for the future generation

   d. There is a shortage of human resource.

6. One of the following is advisable energy source in the world?

   a. Wood fuel c. Solar

   b. Petroleum d. All

7. Which one is possible consequence of climate change?

a. Decertification c. Loss of biodiversity

b. Acidification d. All

8. Which one of the following is main global issue nowadays?

a. Air pollution c. Climate change

b. Scarcity of fresh water d. All

9. In Ethiopia water pollution is mainly caused by?

a. Fertilizer residues

b. Human excreta

c. Industrial influents

d. Wild animals

10. Which of the following practices is useful to control soil erosion in your locality?

a. Contour plough c. Over grazing

b. Cultivation on steep slopes d. All

11. Which part of Ethiopia is highly affected by land degradation?

a. Southern c. Western

b. Eastern d. Northern

12. Which of the following activities aggravates soil erosion?

a. Terracing c. Crop rotation

b. Check dams d. None

13. The awareness of environmental issues, feelings or concern for the environment is _____

a. Environnemental Education c. Conservation

b. Environnent d. None

14. the most important way of preventing environmental damage is?

a. Incentive c. Legislation

b. Environmental education d. employment

15. Which of the following is not true about plants including trees?

a) Purify the air, and provide ground cover to hold the soil in place,

b) protect the water supply, and shelter wild life,

c) add beauty to the land escape and supply many materials for mankind's needs

e) None

16. The exhaustion of one resource produces demands up on others

a) True

b) False

17. An atmosphere filled with pollutants can prevent warming sunlight from reaching earth and can eventually change the climate

a) True

b/ False

18. Many organisms those are harmful to human beings are helpful in maintaining a balance among living things.

a) True b) False

Appendix III: Focus Group Discussion

A. Questions developed to assess the status of trainees in identifying environmental problems and relevant solutions to them.

Instruction:- speak freely what you feel about the question, written or read to you.

1. What are the most serious environment problems in your kebele or woreda.
2. What solutions did you take before, to solve these problems? What is your suggestion about the solution, in the future?
3. What do you think are the causes of problems?
4. Who is responsible to take part in the implementation of solutions to the above environmental problems?
5. What is the relationship between environment, animals you are rearing and afforestation programs you are participating in?
6. What do you say about environment, environmental education and way of training process in the training center?

Thank You Very Much

Appendix IV. Interviews

The aim of this interview is to collect some relevant data about the integration of environmental education into Adult Non-Formal Education programs run by Agri-Service Ethiopia

The data will be used only for research purpose. The information from respondents will be confidential and for the intended purpose only.

Part 1: Interviewing Facilitators

1. What objectives and contents related to environmental education are listed in your teaching modules? Is there a topic which is specific to E.E?
2. Do you have had any additional training regarding environmental education?
3. What kind of approach (interdisciplinary or multidisciplinary) is designed in the course in relation to environmental education?
4. What are the methods of teaching designed in the course?
5. What are the main environmental activities are listed in the course?
6. What are the techniques of evaluation adapted in the course in relation to environmental education?
7. What are the main short comings to integrate environmental education objectives, contents and activities in to the course?
8. Do you haw any comment on environmental education in relation to your course?

Thank You Indeed

Part II: Interviewing Program officers and training director

The aim of this interview is to collect some relevant data on the integration of environmental education in to Adult Non-formal education programs

The data will be used only for research purpose. The information from respondents will be confidential and I assure you that the interview will be used for the intended purpose only.

1. What is your managerial, academic, material and financial support to make the teaching learning process effective

    a. in assessing the needs of the society in program development and curricula material production?

    b. to integrate the immediate environmental problems in the course?

    c. to make the theory part practical in the daily life of the learners and the community as a whole?

2. Is there any relationship between the training centers and the surrounding community in solving environmental problems?

3. What are the most important stakeholders in the overall activities of training? How? In what respect?

4. Is there any relationship between you and EPA? How often does EPA disseminate publications about environmental problems to your training centers?

Thank You Very Much

Part III: Interviewing Zone Agriculture and Rural Development Experts

The aim of this interview is to collect some relevant data about the integration of environmental education in to adult Non-formal education system.

The data will be used only for research purpose. The information from respondents will be confidential and I assure you that the interview will never affect any one in one way or another.

1. What is your institutional relationship to the training center for the case of Adult-Non Formal Education run by Agri-Service?
2. Is there any relationship in program organization, reporting etc between you and training center? If so how often?
3. Is there any expert who can specifically manage and support environmental education in the training center?
4. In what way do you check the integration of general and specific objectives of environmental education into the teaching modules of this program?
5. Do you have any comment about environmental education in relation to your department and the training center?

Thank You Very Much

Appendix V: Observation Check Lists

Part I Coding Sheets- Filled by the raters

This coding sheet is prepared to cheek the integration of environmental education objectives, contents, teaching methodologies and evaluation techniques into the teaching modules of adult non-formal education run by Agri-Service Ethiopia at East Gojjam Zone.

Direction: Read each objective, content/environmental issues, teaching and learning methods and evaluation techniques developed in the modules of 'Family Planning' and 'Conservation of Natural Resources: Water and Soil' courses and show your agreement by putting (✓) mark under each category.

Parameters	Objectives	Content	teaching methodologies	Environmental evaluation Techniques	Remark
Knowledge					
Skills					
Attitudes					
Empirical elements					
Ethical elements					
Aesthetic elements					
Simulation					
Outdoor education					
Case study					
Resource use					
Problem solving					
Total					

Part II Observation checklist filled by the researcher and other contract employees.

Objective: the objective of this checklist is to assess whether integrating environmental education in theory is supported by practice, with adequate teaching aids and practical activities in the training center

No	Items	1	2	3	4	5	Remark
1	Different posters around the training center which can explain the environmental issues						
2	The massages of the posters in relation to environmental issues						
	a. Family planning						
	b. Environmental degradation						
	c. Use of conservation						
	d. Wise use of animal rearing						
	e. Planting trees						
	f. Preparing nursery beds						
3	A catchments area showing						
	a. Terracing						
	b. crop rotation						
	c. Check dam						
	d. Nursery, beds						

Where: 1= very sufficient

2= sufficient

3= insufficient

4= very insufficient

5= not at all

Appendix VI: Amharic version

በአዲስ አበባ ዩኒቨርስቲ የድህር ምርቃ ትምህርት
የሥነ ትምህርት ኮሌጅ

የተማሪዎች መጠይቅ

ይህ መጠይቅ ሠልጣኞች ስለ አካባቢ ትምህርት ያላቸውን እውቀት አመለካከትና ክህሎት ደረጃ ለመለካት የተዘጋጀ ሲሆን ከመጠይቅ የሚገኘው መረጃ /ሳሮቄሮ/ ለጥናት ብቻ የሚውል ነው። ከሠልጣኞች የሚገኝ መረጃ ሚስጢራዊነቱ የተጠበቀ ስለመሆኑ በቅድሚያ ላረጋግጥልዎት እወዳለሁ። ስምዎን መጻፍ የለብዎትም።

መጠይቁን በመሙላት ሊተባበሩኝ በመፍቀድዎ በቅድሚያ አመሰግናለሁ።

ክፍል አንድ፡ የግል መረጃ

ትክክለኛውን መረጃ ከሳጥኑ ውስጥ (✓) ምልክት በማስቀመጥ ያሳዩ

1. የማሰልጠኛ ማዕከል ስም ----------
2. ፆታ ወንድ ☐ ሴት ☐
3. እድሜ
   - ከ18 በታች ☐
   - ከ18-27 ☐
   - ከ28-37 ☐
   - ከ38-47 ☐
   - ከ47 ዓመት በላይ ☐

ክፍል ሁለት፡ ስኬትን ለመለካት የተዘጋጁ ጥያቄዎች

መመሪያ ለሚከተሉት ጥያቄዎች በይበልጥ መልስ ናቸው የሚለቸውን መርጠው ትክክለኛ ውን መልስ ከያዘው ፊደል ፊት ለፊት ባለው ሳጥን (✓) ምልክት በማድረግ መልስ ይስጡ።

በድጋሚ አመሰግናለሁ

1. በቀበሌዎ በጣም አሳሳቢ የአካባቢ ችግር የቱ ነው?

ሀ. የውሃ ብክለት ☐ ለ. የአየር ብክለት ☐

ሐ. የአፈር መሸርሸር ☐ መ. መልስ የለም ☐

2. በአካባቢዎ የአካባቢን ችግር ለመፍታት ወሳኝ አካል ማን ነው ይላሉ?

ሀ. መንግሥት ☐ ለ. መያድ ☐

ሐ. እያንዳንድ ዜጋ ☐ መ. ሐብታሞች ☐

3. ከሚከተሉት የተፈጥሮ ሃብቶች የማይታደስ /ቃቄቃ-ቄስቃስብሮሯቄስ/ የቱ ነው?

ሀ. የዱር እንስሳት ☐ ለ. ማዕድናት ☐

ሐ. አትክልትና ፍራፍሬ ☐ መ. አፈር ☐

4. ከሚከተሉት ለምግብ እጥረት ምክንያት የሚሆን የቱ ነው?

ሀ. የአፈር መሸርሸር ☐ ለ. ያልተመጣጠነ የህዝብ እድገት ☐

ሐ. ደካማ የሆነ የሃብት አያያዝ ☐ መ. ሁሉም ☐

5. ያለተመጣጠነ የህዝብ እድገት ከአካባቢያችን ችግሮች አንዱ ነው ለምን?

ሀ. የመሬት ሃብቶች ውሱን በመሆናቸው ☐

ለ. ህዝቦች ሃብትን በአግባቡ ስለሚጠቀሙ ☐

ሐ. ህዝቦች የተፈጥሮ ሃብቶችን ለቀጣይ ትውልድ የመንከባከብ ፍላጐት ስላላቸው ☐

መ. የሰባዊ ሃብት እጥረት ስላለ ☐

6. ከሚከተሉት ተመራጩ የሐይል ምንጭ

ሀ. የማገዶ እንጨት ☐ ለ. ፔትሮሊየም ☐

ሐ. የፀሐይ ኃይል ☐ መ. ሁሉም ☐

7. ከሚከተሉት ለአየር ንብረት መዛባት ምክንያት የሆነው

ሀ. በርሃማነት ☐ ለ. አሲዳማነት ☐

ሐ. የብዝሃ ህይወት መመናመን ☐ መ. ሁሉም ☐

8. ከሚከተሉት አለማቀፋዊ የወቅቱ አጀንዳ

ሀ. የአየር ብክለት ☐ ለ. የንጹህ ውሃ እጥረት ☐

ሐ. የአየር ሁኔታ መዛባት ☐ መ. ሁሉም ☐

9. በኢትዩጵያ የውሃ ብክለት ዋና ምክንያት

ሀ. የተባይ ማጥፊያና የማዳበሪያ ዝቃጭ ☐ ለ. የሰዎች አይነምድር ☐

ሐ. የኢንዱስትሪ ተረፈ ምርቶች ☐ መ. የዱር እንስሳት ☐

10. በአካባቢያችን ተመራጩ የአፈር መሸርሸርን ለመከላከል ልንጠቀምበት የሚገባ

ሀ. አግድም ማረስ ☐ ለ. የተዳፋት እርሻ ☐ ሐ. ሰድ ግጦሽ ☐

11. በኢትዮጵያ በመሬት መራቆት ይበልጥ የተጎዳው የትኛው ክፍል ነው?

ሀ. ደቡባዊው ☐ ለ. ምስራቂዊው ☐ ሐ. ምዕራባዊው ☐ መ. ሰሜናዊው ☐

12. ከሚከተሉት የአፈር መሸርሸርን የሚያባብሰው

ሀ. እርከን ሥራ ☐ ለ. የከተር ሥራ ☐

ሐ. የአዘርት መፈራረቅ ☐ መ. መልስ የለም ☐

13. ስለ አካባቢ ጉዳይ፣ ስለ አካባቢ ስሜትና ፍላጐት ግንዛቤ የሚሰጥ ---------- ነው

ሀ. የአካባቢ እንክብካቤ ትምህርት ☐ ለ. አካባቢ ☐

ሐ. የአካባቢ እንክብካቤ ☐ መ. መልስ የለም ☐

14. የአካባቢን ጉዳት ለመከላከል ተመራጭ ዘዴ ----------

ሀ. ማበረታቻ ☐ ለ. የአንባቢ ትምህርት ☐

ሐ. ህግ ☐ መ. የሠራተኛ ቅጥር ☐

15. ከሚከተሉት አንዱ ስለ እጽዋትና ዛፎች እውነት አይደለም

ሀ. ቆሻሻ አየርን ያጣራሉ አፈር እንዳይሸረሸር ይረዳሉ

ለ. የውሃ አቅርቦትን ለመጠበቅና የዱር አራዊት መጠለያ በመሆን ያገለግላሉ

ሐ. የመሬት ገጽታን ውበት ይጨምራሉ

መ. መልስ የለም

16. የአንድ ተፈጥሮ ሃብት መመናመን ሌላኛው ሃብት ላይ ተጨማሪ ፍላጐት ያስነሳል

ሀ. እውነት ለ. ሐሰት

17. የአካባቢ አየርን ሊሸፍኑ የሚችሉ በካይ ነገሮች የፀሐይ ጨረርን በመከለል የአየር ለውጥ ሊያስከትሉ ይችላሉ

ሀ. እውነት ለ. ሐሰት

18. ለሰው ልጆች ጎጅ የሆኑ ተዋሲያን የተፈጥሮ ሚዛን በመጠበቅ ጠቀሜታ አላቸው

ሀ. እውነት ለ. ሐሰት

ክፍል ሦስት፡ የተማሪውን አካባቢያዊ ዝንባሌ ለመለካት የተዘጋጁ ጥያቄዎች

መመሪያ፡- ከሃሳቦቹ ፊት ለፊት ባሉ ፊደላት ግርጌ የሚስማሙበትን ሃሳብ (✓) በማድረግ ይግለጽ፡፡ መግለጫ በጣም እስማማለሁ (ሀ)፣ እስማማለሁ (ለ)፣አልስማማም (ሐ) ወይም በጣም አልስማማም (መ)፡፡

በድጋሚ አመሰግናለሁ

ተ.ቁ	ሃሳቦች / አስተያየቶች	ስኬል			
		ሀ	ለ	ሐ	መ
1	ሰዎች ከሌሎች አንስሳት ይልቅ ተፈጥሮን የማዛባት ሃይል አላቸው				
2	የተፈጥሮ ሚዛን በቀላሉ የሚዛባ ነው				
3	ማንኛውም አካል አካባቢውን የመጠበቅ ኃላፊነት አለበት				
4	የሰዎች አመለካከት ናተጠቅመን እናወድምን ከማለት ናበሥርዓት እንጠቀም ለመጭው ትውልድም እናቆየውን ወደማለት ማደግ አለበት				
5	ሰዎች የአካባቢ አንዱ አካል ስለሆኑ አካባቢን የመንከባከብ ወይም የማውደም መብት አላቸው				
6	ያልተመጣጠነ የህዝብ እድገትና ወሰን የሌለው የተፈጥሮ ሃብት አጠቃቀም ለሁሉም ተፈጥሮ ሃብቶች ሥጋት ሊሆን አይችልም				
7	ሳይንስ እና ገንዘብ፣የህዝብ አመለካከት ለውጥ ሳያስፈልግ የአካባቢን ችግር ሊፈቱ ይችላሉ				
8	እያንዳንዱ ሰው የራሱን ተፈጥሮአዊ ተሰጥኦ በመጠቀም ለማህበረሰቡ አወንታዊ አስተዋፅኦ ማድረግ ይችላል				
9	መስኖ፣ ማንጣፈፍ እና ማትከል ተጨማሪ የመሬት ሃብት ሊፈጥሩ አይችሉም				
10	የህዝብ እድገት እና የኃይል የተዛባ አጠቃቀም አሁን እየተፈጠረ ላለው ቁልፍ የአካባቢ ችግር በአንደኛ ደረጃ ሊጠቀሱ የሚችሉ ናቸው				

ክፍል አራት፡ ሬቲንግ ስኬል /rating scale/

መመሪያ አንድ፡ ከዚህ በታች የቀረቡት አሳቦች የአካባቢ እንክብካቤ ትምህርትን የሚመለከቱ ሲሆኑ የሰልጣኞችን የክህሎት ደረጃ ያሳያሉ ተብለው የተዘጋጁ ናቸው፡፡ በሥልጠና ወቅት ምን ያህለ ጊዜ ተደጋግመው እንደቀረቡ በሐሳቦች ፊትለፊት ባሉ ቁጥሮች ግርጌ (✓) ምልክት በማድረግ የራስዎን አስተያየት ያስቀምጡ፡፡

በድጋሚ አመሰግናለሁ

መፍቻ /የመልስ ቁልፍ/

1. በፍጹም
2. አልፎ አልፎ
3. አንዳንድ ጊዜ
4. ብዙውን ጊዜ
5. ሁልጊዜ

ተ.ቁ	ሐሳቦች	1	2	3	4	5
1	የህዝብ እድገት ለመቆጣጠር የሚደረጉ ጥረቶች					
2	የድህነት ቅነሳ የወቅቱ አጀንዳ ስለመሆኑ					
3	የተፈጠሮ ሃብት አመራርን ማሻሻል					
4	የእርከን ሥራና የአፈር እጥበትን መከላከል					
5	የደን ተከላ ተግባራት					
6	የቤት አንስሳት አያያዝ					
7	የአካባቢ መራቆትን መከላከል					
8	የልምድ ልውውጥ ማድረግ					
9	የቡድን ሥራ በክፍል ውስጥና ውጭ ማድረግ					
10	በጣም አሳሳቢ ስለሚባሉ አለማቀፋዊ የአካባቢ ችግሮች ላይ የሚደረጉ ውይይቶች					
11	በጣም አሳሳቢ ስለሚባለ ፡የአገራችን አካባቢ ችግሮች ላይ የሚደረጉ ውይይቶች					
12	በጣም አሳሳቢ ስለሚባሉ፤ በቀበሌአችሁና በወረዳችሁ አካባቢ ችግሮች ላይ የሚደረጉ ውይይቶች					

መመሪያ ሁለት፡ የሚከተሉትን ሃሳቦች አንብበው ከተስማሙ አዎ ካልተስማሙ ደግሞ አይደለም/የለም በሚለው ግርጌ (✓) ምልክት በማስቀመጥ ይመልሱ፡፡

ተ.ቁ	ሐሳቦች	አዎ	የለም
1	መፀዳጃ ቤት አለዎት		
2	የእርስዎ መሬት ላይ እርከን ተሰርቷል		
3	የቤተሰብ ምጣኔ ይጠቀማሉ?		
4	የችግኝ ጣቢያ አለዎት?		
5	የቀንድ ከብቶችዎን አስረው ይቀልባሉ?		
6	የጋራ ቆሻሻ ማጠራቀሚያ ቦታ አለዎት?		
7	ዘመናዊ፡ምድጃ ዱጠቀማሉ?		

ክፍል አምስት፡ የቡድን ውይይት

መመሪያ፡ ከዚህ በታች የሰልጣኞች የክህሎት ደረጃ ለመለካት የተዘጋጅ ጥያቄዎች ቀርበዋል፡፡ የሚሰማህን/ሽን ሃሳብ ነፃ ሆነህ/ሽ አቅርብ/አቅርቢ፡፡

1. በጣም አሳሳቢ የሚባሉ የቀበሌአችሁ ወይም ወረዳችሁ የአካባቢ ችግሮች መንድን ናቸው?

2. የተፈጥሮ ችግሮችን ለመፍታት ወደስልጠና ከመምጣትዎ በፊት እንዴት (በምን መንገድ) ለምፍታት ሞክረዋል? ከስልጠናውስ ምን የተለዩ ነገር አገኙ?

3. የችግሮቹ መንስኤዎች ምንድን ናቸው ይላሉ?

4. ከላይ ተፈጠሩ ስላልናቸው ችግሮች መፍትሄ ለማፈላለግ በይበልጥ ማንን ይመለከታል?

5. አካባቢ፣ እርስዎ የሚያረቧቸው እንስሳት እና በአካባቢዎ የሚደረጉ የደን ልማት ፕሮግራሞች ምን ግንኙነት አላቸው?

6. ስለ አካባቢ ትምህርትና ሥልጠና ሂደቱ እንዲሁም አጠቃላይ ስለአካባቢ ሁኔታ ምን አስተያየት አለዎት?

Appendix VII: Reliability tests

A) **The reliability of judgments, of raters on content analysis**

The probability of the objectives (N=21) developed into the two modules was tested using Cohen's kappa formula as:

$$k = \frac{Pr(a) - Pr(e)}{1 - Pr(e)}$$

Were K- is Cohen's kappa coefficient

Pr (a) - is the relative observed agreement among raters and Pr (e) is the probability of change agreement

Raters	Agreement	Disagreement
Agreement	18	1
Disagreement	0	2

The first rater showed his positive agreement on 18 items (86%) and disagreement on 3 items (14%) of the total of 21 items.

The second rater showed his positive agreement on 19 items (90%) and disagreement of 2 items (10%). In the notation from above we can see that the observed percentage agreement (both positive & negative) is 18+2/21=0.95. Therefore the probability that both of them would agree is 0.86*0.9 = 0.774 and the probability that both of them disagree is 0.14*0.1 = 0.014.

Thus the overall probability of random agreement is

Pr (e) = 0.774 +. 014= 0.788 = 0.79

So applying Cohen's kappa formula

$$k = \frac{Pr(a) - Pr(e)}{1 - Pr(e)} = \frac{0.95 - 0.79}{1 - 0.79} = 0.76$$

Similarly the Cohen's kappa coefficient of contents, methodologies and evaluation techniques were found 0.72, 0.79 and 0.81 respectively

B, **The reliability of the achievement test**

The reliability of the knowledge test was computed by split- half method using spearman formula as follows:

Reliability of split half (roE) = $\frac{N\Sigma EO - \Sigma E\Sigma O}{\sqrt{N\{\Sigma E^2 - \{\Sigma E\}^2\}\{N\Sigma O^2 - \{\Sigma O\}^2\}}}$

Were E- even numbered items

O- odd numbered items

N- No of respondents.

Reliability of whole items = $\frac{n^* roE}{1 + (n-1) roE}$

Were n= is no of splits

Therefore

$\Sigma E = 811.6$ $\Sigma 0 = 86 = 32$

$E = 36.89$ $O = 39.42$

$\Sigma E^2 = 61434.67$ $\Sigma 0^2 = 66052.39$

$(\Sigma E)^{2=} 658694.56$ $\{\Sigma O\}^{2=} 752243.98$

n= 2 (add-even) $\Sigma EO = 65464.13$

$\{\Sigma E.\Sigma O = 703916.912$

N=21

$$roE = \frac{21*65464.13 - 703916.91}{\sqrt{\{21*61434.67 - 658694.56\}\{21*66052.39 - 752243.98\}}}$$

$= 0.56$

The reliability of whole item = $\frac{nroE}{1 + (n-1) roE} = \frac{2*0.56}{1.56} = 0.71$

Where n=2

C. Reliability of attitude inventory and skill test

	Cronbach's Alpha	Number of items	Number of respondents
Attitude	0.812	10	21
Skill	0.864	12	21

At P< 0.05

D/Judgments on achievement test

Items	Judges				Average	Remark
	1	2	3	4		
1	4	4	4	4	4	
2	3	2	4	4	3.25	
3	4	4	4	3	3.75	
4	2	1	2	2	1.75	dropped
5	4	4	4	4	4	
6	3	3	3	3	3	
7	4	4	4	2	3.5	
8	4	4	4	4	4	
9	4	4	4	4	4	
10	3	3	2	3	2.75	modified
11	2	1	1	2	1.5	dropped
12	3	4	4	4	3.75	
13	4	4	4	4	4	
14	4	3	3	3	3.5	
15	3	3	2	1	2.25	modified
16	4	4	4	4	4	
17	3	2	4	4	3.25	
18	4	4	4	3	3.75	
19	4	4	4	4	4	
20	3	3	4	4	3.5	

Appendix VIII: Figures

Fig 4.2.3.1 Integrated Animal Fodders at Gunaguna Center

Fig 4.2.3.2 Demonstration site at Dibo

Fig 4.2.3. 3 Children are on planting animal fodder trees -Dibo

Fig 4.2.3. 4-Practices to control gulley erosion at Dibo

Fig

4.2.3. 5 Integrated environmental protection at Dibo

Fig 4.2.3.6 One of Catchment areas at Gunaguna

Fig 4.2.3.7 Increasing of Productivity due to terracing at Zimbitit

Fig 4.2.3.8 Trainees at the demonstration site-Gunaguna center

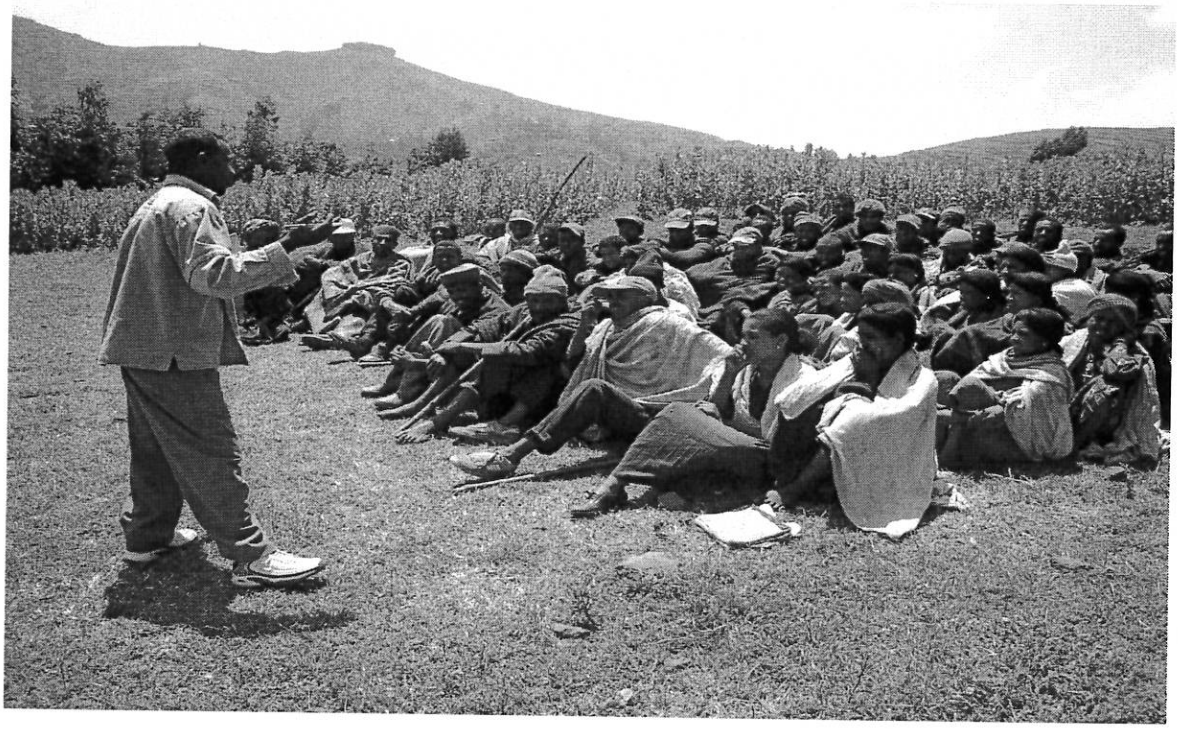
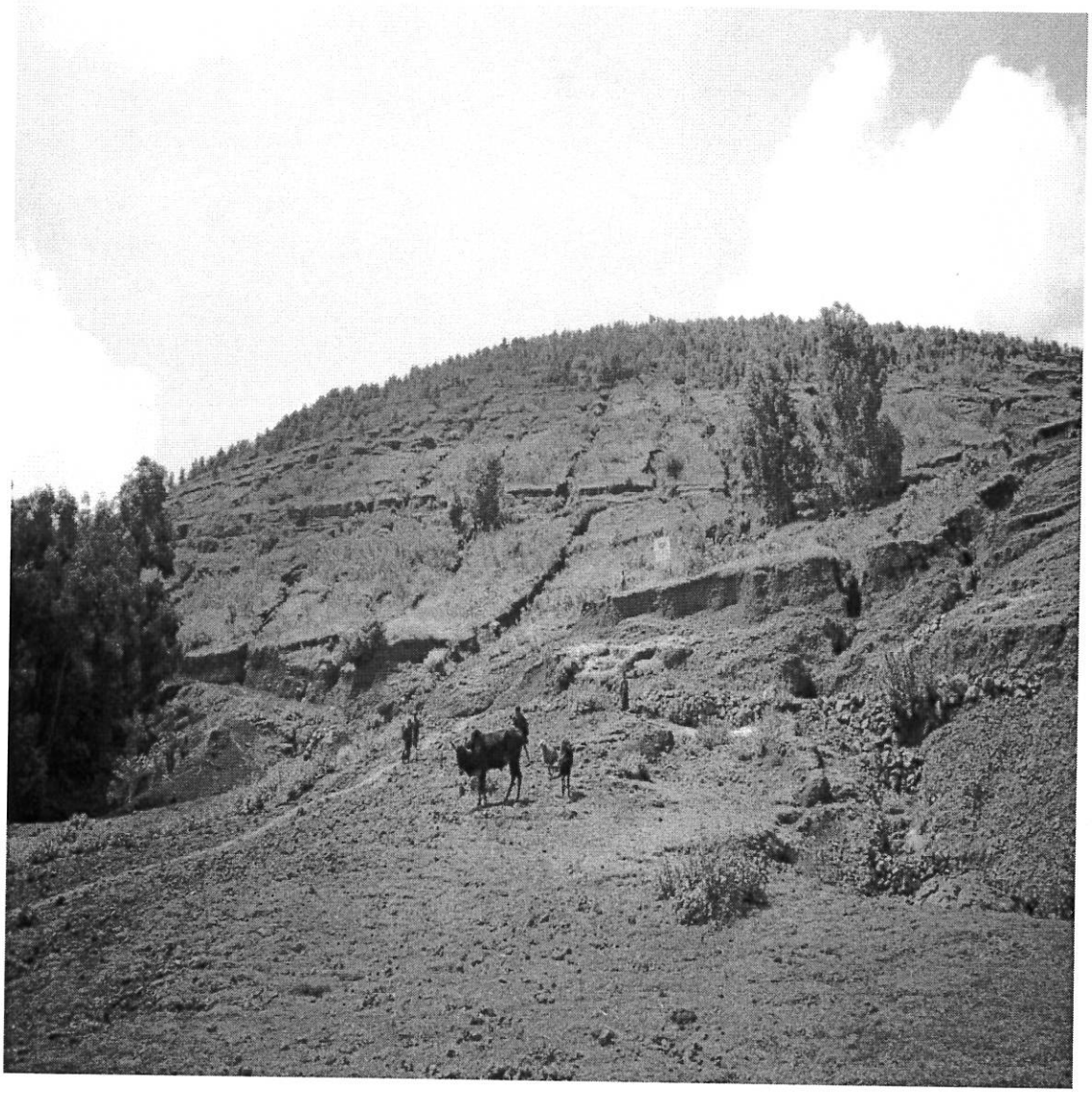


Fig 4.2.3. 9 Free grazing around Zimbitit



Declaration

This thesis is my original work and has not been presented for degree in any other university and that all sources of materials used in the thesis have been duly acknowledged.

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Date of submission---18/07/2009---

The thesis has been submitted for examination under my approval as a research advisor

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Date of submission---15/07/2009---