The Role of Education in Addressing Environmental Problems and Sustainable Development of Ethiopia

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Introduction

Although modern education was introduced hundred years ago in Ethiopia, its effects are not as such visible in development of the country as compared with the role education has played in developed countries. In Ethiopia, long years ago, education was used to prepare personnel for different purposes in different organizations while education was used to enable people in America to utilize resources through innovation and advancement. For example, in the 18th and 19th centuries, America was "full of inexhaustible resources of every kind," (Jain et al, 2002, p.283. Moreover, in European countries, education was used for economic development and technological advancement.

In the 21st century, people throughout the world have to learn not only to exploit the resources available using different technologies but also to understand the interaction they have with their environment and the consequences. However, the interaction between people with their environment resulted in serious environmental problems besides their superior achievement. Regarding this, Joseph and Nagendran (2005, p. 4) underlined:

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> During the last few centuries, man has made unbelievable progress with his intellect. Many landmark discoveries and inventions have contributed towards better living in many respects. However, some of the activities undertaken to improve the quality of life have backfired, owing mainly to lack of forethought and inability to foresee long-term effects. Problems faced by us today, such as environmental pollution, acid rain, ozone depletion, greenhouse effect, cancer, and other health hazards are a few of the unforeseen results of man's overindulgence in using natural resources.

Nowadays, environmental problems are serious global, African and Ethiopian issues although they might vary in kind and intensity. This is because people have caused immense environmental changes in their quest for survival and development (UNEP, 1988). 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. The failures of the former result in having more people: who are hungry; cannot read and write; cannot get safe water; cannot have safe homes; and who face shortage of wood fuel for cooking and warming themselves. So does the gap between developing and developed nations. 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 agenda that needs immediate solutions from people in the world.

Poor resource and environmental management causes not only global environmental problems but also continental ones. Africa, for instance, as a continent has been facing different serious environmental problems: population explosion, poverty, deforestation, desertification, soil erosion and health problems. For example, Africa experienced widespread food

shortages, 22,000,000 in central Africa and 10,000,000 in Ethiopia alone in 2005 (Banton, 2005 in UNEP, 2006). This shows that most of the people in Africa might not satisfy their basic needs in the 21st century.

As was discussed, poverty has been one of the environmental problems in Ethiopia that causes resources degradation such as forest and soil. This is acute in the highland areas (Aklilu, 2001; Teller, 2005). Moreover, specifically, (UNEP, 2006, p. 12) stated that:

> 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.

This implies that environmental problems have been accelerating at rapid rate at Ethiopian contexts in this century. What should be the solution? Does our education designed in a way to address such serious problems?

The need to search new context of education in both developed and developing countries has been arisen in the 21st century. The most significant factors for the new context of education are growth of knowledge and information; demographic changes; increasing interdependence among countries (e.g. new information technologies and globalization); and new social community concerns (UNESCO, 1998).

Therefore, education, unlike the pervious eras should not focus on transmitting cultural values and preparing for work of life. Rather,"…education be constructed on four pillars: learning to know, learning to do, learning to be and learning to live together"(UNESCO, 1998,

p 2). These are the peculiar characteristics of Environmental Education (EE). Based on this rationale, different regional, interregional or governmental and international conferences, seminars and workshops have been conducted to search possible solutions for the rapidly accelerating environmental problems in this world. Among the solutions, EE is the one that was suggested in the International Union for the Conservation of Nature and Natural Resources (IUCN) in 1970.

Following this, the first major conference on the human environment was held in Stockholm in 1972 that recommend establishing International Environmental Education Program (IEEP) that deals with interdisciplinary approach, in school and out-of-school, encompassing all levels of education and people at different age level and in different walks of life to manage and control their environment (United Nations, 1972).

The second major conference of the United Nations, two decades after Stockholm, the United Nations Conference on Environment and Development (UNCED) – the Earth Summit was held in Rio de Janeiro, Brazil in 1992. The Earth Summit resulted in five major achievements. Among these, Agenda 21 is the one that focuses on action plans needed in order to work towards sustainable development particularly with regard to the public awareness, training and education (UN, 1992 in Scott and Gough 2004,p. 22). This issue was described in the conference as:

> Education including formal education, public awareness and training should be recognized as a process by which human beings and societies can reach their fullest potential. Education is critical for promoting sustainable development and improving the capacity of the people to address environment and development issues.

The third major conference of the United Nations, three decades after the Stockholm, the World Summit for Sustainable Development (WSSD)-Johannesburg Summit was held in Johannesburg, South Africa in 2002. In

the conference, the United Nations Decade of Education for Sustainable Development International Implementation Scheme (UNDESD-IIS) was set up. It states that "… Education for Sustainable Development (ESD) has its roots in history of two distinct areas of interest of the United Nations: (1) quality basic education; and (2) environmental education for sustainable development" (UNESCO, 2005a).

From these major conferences and agreements reached, it is clearly implied that EE includes education about, in and for the environment is one of the roots for our environment and sustainable development (Beck and Earl, 2000; Palmer, 1998; Rush et al, 1999). Understanding these typical characteristics, many developed and developing countries have been trying to introduce EE into their education system as a subject or in an integrated manner with other subjects at different levels in line with the efforts exerted in different conferences and seminars as discussed before.

In parallel with these major conferences and agreements, many countries in the world such as USA, Australia, Canada, China, South Africa, Spain, and Uganda have integrated EE in their formal education at different levels (Palmer, 1998). Further, according to the chair of the National Curriculum Council of UK, "Environmental education is an essential part of every pupil's curriculum. It helps to encourage awareness of the environment, leading to informed concern for and active participation in resolving environmental problems,"(Beck and Earl, 2000, p. 97). Similarly, the assessment made on the progress and problems of EE in East Africa countries-Ethiopia, Kenya, Tanzania, Zambia and Uganda in 1992 showed that all of them integrated EE into their primary education and only Zambia and Kenya did in their secondary school level (Lindhe et al., 1993 as cited in Aklilu, 2006).

Statement of the Problem

In the past, education was not given key roles to address environmental and development related problems. According to Serageldin, et al. (1998, p. 36), "Education was not absent…but it was assigned a supportive, even

peripheral role" to overcomes the problems and to bring sustainable development of a nation in particular and the globe at large. In other words, there is a serious problem in formulating and implementing education policy document and translating it into curricula materials through the right curriculum design and teacher training to bring the intended outcome in the schools, in the society and in a given nation at large.

For instance, there is a problem of translating the policy objectives into practice in some African countries. Scholars like Psacharopouls (1990) evaluated the gap between educational policy and the actual practices and failures in some African countries. He identified that the intended policy was never implemented because the policy intention was too vague and the intention was lip service or a political statement; although there was an attempt to implement, it failed to be completed because prerequisite factors such as feasibility and rejection by the society. Moreover, although the policy was implemented, it did not have the intended effect due to invalid theoretical model and insufficient information and evidence in the policy development process.

On the other hand, the new education and training policy of Ethiopia focuses on developing students' creative, productive and problem solving ability and skills, and addressing the needs and problems of the society. Hence, education has been given key and central role to overcome the problems and to bring sustainable development of Ethiopia as Serageldin, et al. (1998, p. 36) stated, "In the course of 40 years, education has moved from the periphery to the center of thinking about development."

Regarding our curriculum, different scholars agreed that it had been a tradition to copy the curriculum of various countries such as French, British, American, and East Germany education system. For instance, Tekeste (1990) witnessed that our secondary education curriculum was inappropriate and dysfunctional. This shows that our secondary education did not focus on our real regional and national context or environment. Still the present curricula materials of different subjects such as curriculum guides and

students' textbooks at secondary level in our education system were criticized because of poor quality to address current social, economic and environmental problems and issues in an integrated manner (Dessalegn, 1998; Aklilu, 2001). These materials were criticized since they did not address issues and problems of our environment at local, regional, national and global contexts. Jonassen (2004, p.2) discussed, "Content, the coin of educational realm, is relatively meaningless outside the context of a problem. From kindergarten through graduate school, students study content without clear purpose or reason." However, it seems that curriculum experts in Ethiopia believe that including more contents, without having future purpose, in different subject areas while they design and develop curricula materials, is very important rather than treating the issue inline with contemporary and serious problems that education has to address. Not only curriculum experts in Ethiopia but also different educators worldwide (e.g. policy makers and teachers) conceive curriculum as the accumulation of facts (Scott and Gough, 2004).

However, there is a growing interest and concern to reorient education to play its role for sustainable development of a nation as well as a globe beginning the last decade of the 20th century. Sterling (1996), in Rush et al. (1999, p. 20), discussed the relationship and the need for the reorientation of education if education for sustainability is to succeed. He underlined, "Education is proclaimed at a high level as the key to more sustainable society, and yet it daily plays a part in reproducing an unsustainable society. If it is to fulfill its potential as an agent of change towards a more sustainable society, sufficient attention must be given to education as the subject of change itself." To make this interest practical, EE has been taken as a root of addressing sustainable development by integrating it into different curricula materials at primary, secondary, and tertiary levels as a subject or by infusing it into different subjects or courses. As Hopkins et al. (1996) in Yencken et al. (2002) underlined, the roots for sustainable development are firmly planted in environmental education.

As to teachers training, on the one hand, Jonassen (2005) described, "Educators face to teach learners problem solving skills." On the other, The Brundtland Report of the WCED (1987, p. xiv) argued, "The world's teachers ... have a crucial role to play" in helping to bring about "the extensive social changes" needed for sustainable development. Above all, teachers are not only trained how to teach EE to develop students` environmental knowledge, skills and attitudes but on how to teach for sustainable development of a given nation (Lea Filho and O`Loan, 1996). Specifically, although many teachers in Ethiopia have believed that the process of teaching and learning focuses on transferring knowledge written in curricula materials (e.g. students' textbooks, teachers' guide) into their students' mind , the present education policy and the actual practice advocates student - centered and problem solving teaching and learning approaches which are the key elements of EE.

Above all, the findings of Yencken, Fien and Sykes (2002) on the best way to prepare young people for the task of sustainability showed that learning was separated cognitive from affect and behavior; did not give students the opportunities to relate the health of people to the health and sustainability of ecosystems. In addition, they identified that only rarely have students been asked to reflect upon the impacts of their activities, and those their families and the society on the functioning of ecosystems, and cognitive and practical skills for practising sustainability are mostly ignored in school curricula. They also recommended that reorienting education for sustainability not only achieved by changing the objectives, contents and teaching methods of each subject or the whole subjects, but it also requires reforming the curriculum design, assessment and teacher education. This shows teachers who are the main actors of the teaching and learning process should also get training on how to teach for sustainability in pre-service and in- service programs.

Therefore, this article tries to answer the following questions:

1. What does the present literature in education say in addressing environmental problems and sustainable development of a nation?
2. Does the present education and training policy of Ethiopia incorporate elements of EE?
3. What does the present research say on the practice of EE at different level of education in Ethiopian?

The Role of Education in Addressing Environmental Problems

Education plays a significant role in changing the behavior of people towards their environment. To accomplish this task, it should be related with the environment. Rush et al., (1999, p.22) underlined that the "Fundamental to the development of EE has been the relationship between education and environment". Consequently, educators in general should understand this relationship while planning, implementing and evaluating education at different levels for sustainable development locally, nationally and globally. Education becomes all-rounded and meaningful for students, teachers and the community at large when it is given based on the real context of their environment.

Environment-based education is using the environment as a tool for achieving broader educational goals while EE focuses on building a base of environmental knowledge, skills and attitudes to be applied to solve environmental problems (North American Association for Environmental Education-NAAEE, 2001). This education brings the following effect on students: improved motivation, skills for lifelong learning, career preparation and attitudes of respect and responsibility. Above all, the benefits of environment –based education to students, teachers and communities are to produce: high performance lifelong learners, effective future workers, and problem solvers, thoughtful community leaders and participants, people who care about the people, creatures and places around them (NAAEE, 2001).

In short, integrated learning across disciplines, problem solving, decision making, independent and group learning, and issue–based instructional activities are the hallmarks of environment-based education (NAAEE, 2001) that accelerate education to play for sustainable development of a nation.

Education for Sustainable Development

Unlike education in the previous centuries that mainly focused on teaching about and in the environment, education in the 21st century should focus on addressing the present intense environmental problems to bring sustainable living in the world. This can be achieved when EE is given at different levels of education in an integrated way. Education for the environment, which is one of the components of EE, is a key element of the teaching-learning process for sustainable development of a given country.

According to Scott and Gough (2004, p.33), "Education for sustainability means preparing everyone to care for the planet by respecting justice, local identity, and fundamental requirements for all well being." They also discussed the characteristics of education for sustainable development as:

> Education for sustainability is a process of societal transformation in which all learners share and adjust. The classroom becomes the changing roles of experience for co-operation around managing for more well being via less resource use and recyclability (sic). The tools for ensuring this should be tried out in the classroom and transferred to the community that is the community becomes the child and parent learning form each other. Right now education is not preparing any of us for the perspective, so education for sustainability remains elusive and unfulfilled (pp. 33-34).

It is to mean that the right place to practice sustainable living should be classrooms. Students should identify and share problems of their environment at local, regional and global levels. They should also

hypothesize, collect data, analyze, interpret and arrive at solutions, test them in their schools compound. Finally, they should share to the nearby community. Then, the communities share best experiences to other communities to solve their problems and address their needs in a sustainable manner. This is typically significant for countries like Ethiopia where most of their people are illiterate and poor.

Above all, sustainable development cannot be expected without environmental sustainability though the other factors such as social and economic are achieved in the desired level. Beck and Earl (2000, p. 99) state the following:

> Sustainable development emphasizes the need to reconcile economic development and conservation of the environment, and to place a consideration of environmental issues within a social, economic and political context. This concern with sustainability links with education for the environment, and gave a new impetus globally to environmental education.

Generally, education should play its role for sustainable development of a given country by integrating education for the environment. To accomplish this, educators such as curriculum experts, teachers and the like should be familiar with the relationship between learning and sustainable development (UNESCO-UNEP, 1994; Palmer, 1998; Scott and Gough, 2004). Therefore, they can give due attention for EE during planning and the actual teaching-learning process at different levels in an integrated manner across the curricula materials at different levels of education of a nation to bring not only environmental sustainability but also economic and social sustainability.

EE for Environmental Problems and Sustainable Development

The significance of education to overcome environment and development problems in an interrelated manner, according to the WCED (1987, p. 113), "Education should …provide comprehensive knowledge, encompassing and cutting across the social and natural sciences and the humanities, thus providing insights on the interaction between natural and human resources, between development and environment." Education can play this role when EE is part of the formal education at different levels in the planning as well as in the actual teaching and learning process. In other words, the contents of education, typically curriculum materials such as curricula guides and students textbooks at different levels should integrate environmental problems, and the methods of teaching should coincide with these contents. According to Thomas (1990, p. 314):

> Education is one of the most important instruments for correcting the damage that has already been done to the natural environment, and the content of education should reflect these questions: what present day environmental conditions threaten the quality of life on earth? If the forces producing such conditions continue unchanged, what consequences can be expected in future? What steps can be taken to reverse, or at least to retard, the deterioration of the environment? What can individuals such as students, do to alter the forces that endanger the quality of life?

To Thomas, the above questions can be answered when the curricula materials address issues related the questions rose above. For instance, the first and the second questions can be answered when environmental problems like the green house effect, acid rain, ozone depletion, deforestation and waste disposal are included as a content of the curriculum. The third question can be answered by including contents such as legislation, incentives, exploration and invention, recycling and reclaiming in the materials and/ or in the actual teaching and learning process. Above all, the last question stressed on facilitating and developing citizens` (e.g.

students) active participation to solve environmental problems. Therefore, according to Thomas (1990), students can learn to evaluate legislator's voting record, write effective letters to political figures, conduct peaceful demonstrations to publicize either damaging or constructive actions of public officials and businesses, and boycott ecologically destructive commercial ventures, and improve their own daily treatment of the environment and organize campaigns to alter damaging practices with their school and community.

When planning education at different levels such as making curriculum revision and in the actual teaching-learning process, the three interrelated components of education, education about, in and for the environment, should be equally treated in an integrated manner (Dufour, 1990; Palmer, 1998; Beck and Earl, 2000; Scott and Gough, 2004). According to Palmer (1998, p. 143), "…all are essential components of planning at every level of education." Above all, these interrelated components of EE can address knowledge, skills and attitudes in an integrated manner if the right attention is given for all in the development and revisions of curricula materials, as well as in the teaching and learning process. The way the three components of EE integrated during the planning and implementation of curricula materials are shown in the following manner by Palmer.

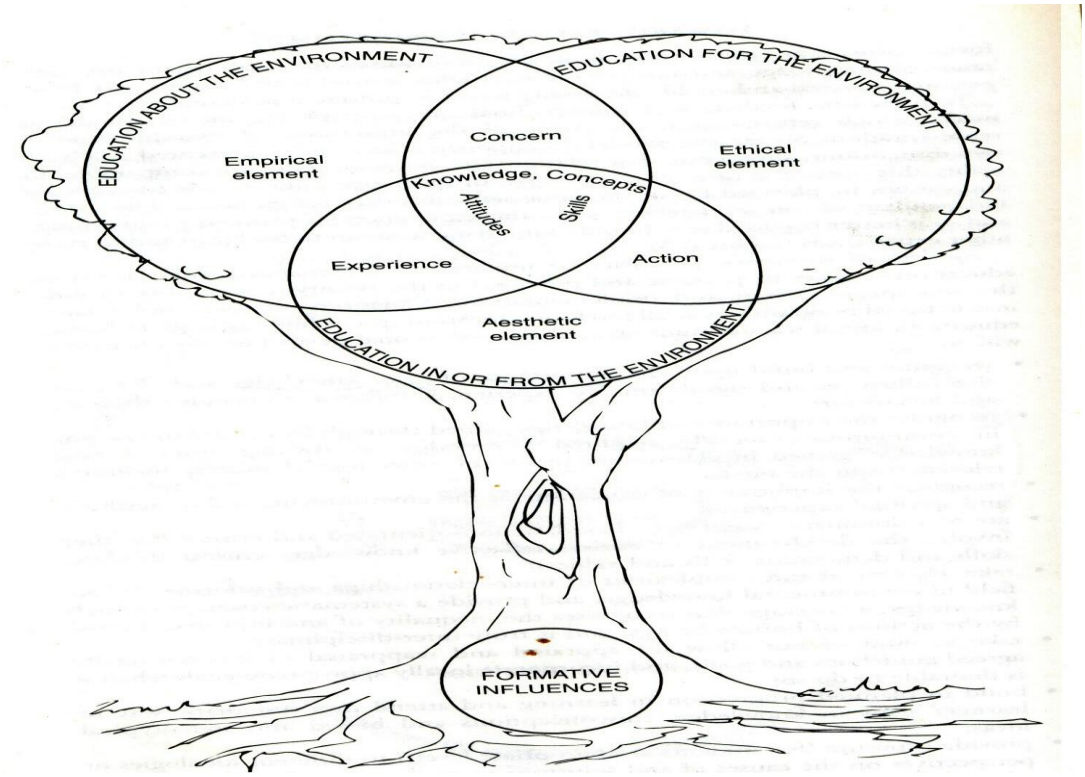

Figure 1: A Dynamic Model of Planning and Implementing Environmental Education, Adopted from Palmer (1998)

According to Palmer (1998, p. 268-269), any curriculum review needs to consider whether the essential elements are adequately covered by asking questions as:

- do students have as many opportunities as possible for empirical investigation in the environment, for observation, measuring, recording, interpreting and discussing what has been observed?
- are students aware of the complex nature of the environment (e.g. the inseparable nature of the various

components of the environment and the unique position of human life in relation to other things)?
- is there a focus on aesthetic dimensions and qualitative study rather than quantitative ones? and
- are the students introduced to the ideas of personal responsibility for the environment by including ethical elements?

Hence, one can explicitly understand from the questions raised by Palmer that the model developed by him is not only crucial for EE but for different subjects at different levels of education. This is more significant when EE is integrated into different subjects for the holistic development of individuals` knowledge, skills and attitude, and for making education play its central role for sustainable development of a country.

In 1980s, EE was perceived and understood as means for sustainable development by establishing the World Conservation Strategy in 1980. In the strategy, the "importance of resource conservation through 'sustainable development', and the idea that conservation and development are mutually inter-dependent" were emphasized (Palmer, 1998:15). Following this Brundtland report, prepared by World Commission on Environment and Development, focuses on 'Our Common Future', focus on how to reconcile environment and development issues (Palmer, 1998, p. 16). According to WCED (1987), people in the world have faced common challenges: alarming population growth, poverty, resource degradation, industrialization and its negative consequences that lead to local, national and global environment problems such as global warming, desertification, deforestation, air pollution and ozone depletion. To overcome these and other environmental problems at local, national and global levels, 'common endeavors' are urged throughout the world through education typically through EE that addresses the marriage between environment and education.

> Education must be improved in quality and in relevance to local conditions….Environmental education should be included in and should run throughout the other disciplines of the formal education curriculum at all levels – to foster a sense of responsibility for the state of the environment and to teach students how to monitor, protect, and improve it. These objectives cannot be achieved without the involvement of students in the movement for a better environment…. (WCED, 1987, p. 113).

In 1990s, one of the major events in education, typically in EE is the second major conference of United Nation 'The Earth Summit' held in Rio de Janeiro, Brazil in 1992 (UN, 1992; Rush et al., 1999; UNESCO-UNEP, 1994; Palmer, 1998). In the conference, the role of education for addressing sustainable development was emphasized through integrating environment and development issues. This shows that education for the environment, which is one of the major components of EE, should be integrated in the planning and actual teaching–learning process of the education process. That is why 'Agenda 21' of the conference gives one of its emphasis on developing awareness of the people about their interaction and interference with our environment through education and training.

In 2000s, the role of education for sustainable development laid its base on EE, together with quality basic education (Scott and Gough, 2004; UNESCO, 2005a; Aklilu, 2006). Above all, due attention has been given integrating the three components of EE (education about, in and for the environment) into formal education curriculum, specifically in different subjects (Palmer, 1998; Scott and Gough, 2004). In order to reorient our education to play its central roles for alleviating environmental problems and bringing sustainable development by integrating EE, educators should bear in mind our environment, EE, the policy document, curriculum and teacher education interrelationship.

Therefore, educators should examine whether the education policy of a nation is formulated with the current environmental issues and problems by integrating

EE at different levels of the education system. In doing so, they have to check if the policy objectives are translated into curricula materials like syllabus, textbooks and teachers' guides using the right curriculum design(s). They have to also crosscheck if the training given in teachers education match with the intentions of the policy document since teachers are the actors who perform with the students in the real environment to achieve the objectives of the policy. Hence, what does the situation look like in Ethiopian context? Do the present policy document, curriculum design(s), curricula materials, teacher education and the teaching and learning practice in Ethiopian education integrate elements of education for our environment and sustainable development? To depict the situation, the author developed the following framework.

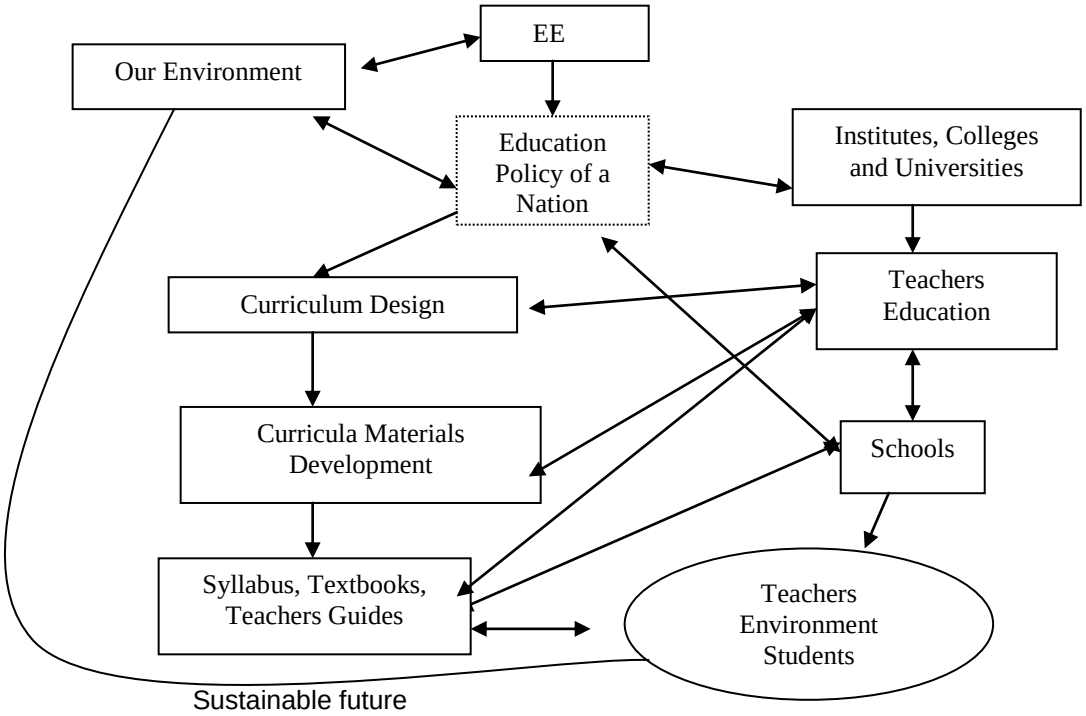

Figure 2: The Interrelationship among Our Environment, EE, Education Policy of a nation, Curriculum Design and Teachers Education

The Education and Training Policy of Ethiopia and Environmental Education

In the twenty-first century, education has been given central role to play and address environmental problems at local, national and global contexts. Not only education is expected to address these problems, but also it should play significant role for sustainable development of a nation in particular and the globe in general by integrating theory with practice. Education, at different levels, can only play these roles when its philosophical foundation is cemented and developed in line with the roles education is expected to play in the education policy of a given country. These can be expressed by the aims, general and specific objectives of the policy document.

In 1994, Ethiopia developed the Education and Training Policy. The policy document included aims, objectives of education and training, and overall strategy.

Aims, General and Specific Objectives in the New Education and Training Policy Related to Environmental Education

Aims - some of the aims of education developed in our education policy are related with the aims of EE. They are to:

- strength the individual's and society's problem solving capacity, ability and culture;
- improve, change, develop and conserve our environment for the purpose of an all-rounded development; and
- bring up citizens with the necessary productive, creative and appreciative capacity to participate fruitfully in the development and utilization of resources and the environment at large (TGE, 1994).

To achieve such aims of education, the general and specific objectives of the policy also include elements of EE objectives.

General Objectives Related to the above Aims of Education

- Develop the physical and mental potential and the problem solving capacity of individuals by expanding basic education in particular and education in general;
- Bring up citizens who can take care of and utilize resources; and
- Cultivate the cognitive, creative, productive and appreciative potential of citizens by appropriately relating education to the environment and societal needs (TGE, 1994).

Specific Objectives Related to the above Aims of Education

- To develop and enrich student's inquisitive ability and raise their creativity and interest in aesthetic;
- To promote education that can produce citizens who possess national and international outlook on the environment, protect natural resources and historical heritages of the country; and
- To provide education that can produce citizens who have developed attitudes and skills to use and tend private and public property appropriately (TGE, 1994).

Some of the aims of education, general and specific objectives in the policy document clearly showed that the three components of EE: education about the environment (empirical elements), education in the environment (aesthetic elements) and education for the environment (ethical elements) are also given their own places by relating education to our environment, and the needs and problems of our society. Above all, in the document, education has been given significant role in changing students' attitudes to utilize, conserve and protect their environment for the purpose of all-rounded development (social, economic, etc.) of Ethiopia, as well as the globe.

In other words, according to TGE (1994), the outcomes of education are expected to develop students` whole personality having the right cognitive ability, skills typically problem solving and positive attitudes to natural

resources, personal and public property in particular, and to the local, national and global environment in general. As a result, students can solve the societal and their problems at local, national and global contexts.

In the policy document, one of the foci area emphasized is relating our education to our environment, practice and development so that it can play its role for all rounded development of our society (TGE, 1994). In the policy statements, typically in the general and specific objectives, the attempt of giving due attention for our environment is described, as education should: develop individual problem-solving capacity, bring up citizens who can take care of and utilize resources wisely, and who posses national and international outlook on the environment, protect natural resources and historical heritages of the country. This shows that the contents of our education have to include national and global environmental problems. So do the local ones. When these problems are integrated in the development of curriculum materials like curriculum guides and students` textbooks and in the actual teaching learning process, students try to identify and prioritize and try to solve environmental problems at local, regional, national and global levels. As a result, students not only develop problem-solving skills but also can have positive attitudes to the local, national and global environment by protecting illegal acts and utilizing resources wisely. However, there is a problem of translating the policy objectives into practice in some African countries.

Moreover, in most developing countries typically Africans, there is a problem of translating the policy statements into action plans, specifically into curricula materials (e.g. Education Sector Development Programs, curriculum guides, student textbooks, teachers` guides) and the actual teaching-learning process. For instance, in Ethiopia, in line with the Education and Training Policy, a twenty-year education sector indicative plan has been translated into Education Sector Development Programs (ESDPs: ESDP I from 1997/8 to 2001/2, ESDP II from 2002/03 to 2004/5 and ESDP III from 2005/6 to 2010/11). Each ESDP has its own issues, goals, strategies, crosscutting issues. For example, the main issue in ESDP II and

ESDP III is poverty reduction having four major priority sectors: roads, education, agriculture and natural resource, health sectors (MOE, 2001 and MOE, 2005). However, these program action plans, like the policy statement, do not clearly show the role of education to fight against poverty by consuming, conserving and protecting our natural resources. Further, they do not show how the local, national and global environmental problems should be treated as a subject in an integrated manner at different levels of our education. Moreover, the role that education can play to overcome problems in relation to poor agricultural practices and resource management in line with population explosion, and their consequences like deforestation, soil erosion, desertification, climatic change, poverty, drought, and so forth, is not clearly stated in an integrated manner into education at different levels.

Besides, unlike cross cutting issues such as gender, HIV/AIDS, civics and ethical education, special need education, and quality of education stated in the ESDPs, one of the most significant components of sustainable development, our environment is not addressed. Hence, the above issues do not encompass the local, national and global environmental problems to develop students' problem solving skills and the right attitudes to take the right action individually and/ or collectively. This shows that the role of education for sustainable development, education for our environment, might not be given due attention in the ESDPs. Not only is there a problem of translating the policy document into action plans but also, there is a problem of adapting the best curriculum design that fit with the objectives of the policy document.

Curriculum Design: Conceiving Curriculum as a Fact

Different educators conceive curriculum as the accumulation of facts (Scott and Gough, 2004). The problem lays on the ability of educators in selecting and synthesizing different philosophy of education that focus on facts, problems, and societal issues separately. Barrow and woods (1988, p.21) underlined as:

> One of the main problems facing as far as curriculum matters are concerned is the problem of selection. What we want is a principle or principles, by virtue of which we are in some way peculiarly relevant to education, those things that ought to be studied, taught, and learnt, in schools, colleges and universities.

To overcome these problems, attempts have been made in developing different curriculum issues. Nowadays, there are three different curriculum issues: curriculum as a fact, curriculum as practical and curriculum as critical theory (Scott and Gough, 2004; Chi Kin Lee and Williams, 2001).To them, technical curriculum highlights the process of pre-specifying behavioral objectives, and then delineates the specific subject content and instructional strategies that should be employed to produce those behavioral outcomes. According to this view, knowledge perceived as a commodity that is created by experts and transmitted by teachers to their students, rather than being constructed from the interactions between a teacher, students and materials in their own real context. The texts for instruction are the pre-existing sources of authoritative knowledge and the dominant curriculum concern is subject content. Such technical curriculum theorizing tends to support education about the environment (Scott and Gough, 2004; Chi Kin Lee and Williams, 2001).

Practical curriculum theorizing stresses the subjective meanings participants attach to their actions, especially their social interactions. And it is based on the assumption that the student is recognized as an active participant in the production and verification of meaning, rather than a reproducer of understandings developed by others. In this model, teachers are identified as facilitators and organizers of experience in the environment. The texts for instruction are the pre-existing sources of guidance about environmental experiences and the dominant curriculum concern is the process of teaching and learning. In this model, curriculum is viewed as something ‘practical’, created in the interactions among teachers, students and educational

materials in the real environment (Scott and Gough, 2004; Chi Kin Lee and Williams, 2001).

In the critical curriculum perspective, knowledge is perceived as being socially constructed and the role of education as being to enlighten and empower individuals, particularly those who are disadvantaged or oppressed because of their race, class, or gender. Individuals are encouraged to engage in critical reflection on their experiences and actions with a focus on the critical analysis of the students' situation that is embedded in political, economic and cultural ideologies in society. Teachers are defined as collaborative inquirers whilst students are perceived as active generators of new, working knowledge. Critical curriculum theorizing finds its support in education for the environment (Scott and Gough, 2004; Chi Kin Lee and Williams, 2001).

However, treating these curriculum issues individually has their own typical limitation. Hence, to overcome the problems of each issue, they should be seen as an integrated whole: education about the environment (technical), education in/through the environment (practical) and education for the environment (critical). These are the basic components of EE. Such a holistic approach should take fully into account the following propositions: EE is not a subject in itself but rather a function of education with a content that is drawn from across the whole of the school curriculum; investigation of environmental issues should range from local, regional, national to global scales; integration of education about, in and for the environment is required; EE should encompass the whole development of environmental awareness, knowledge, values, responsibility and action(Sterling, 1990; Tilbury, 1995 in Chi Kin Lee and Williams, 2001). In other words, rather than treating the different curriculum designs (subject - centered, learner- centered and problem – centered) that Ornstein and Hunkins (1998) classify in isolation, it is very significant to use an integrated design to address the current environmental and societal problems in countries like Ethiopia.

From my personal experiences and observations as a teacher at different levels, although there is a great attempt, there is a serious problem of leaving space for the school teachers or integrating environmental and societal problems at local, national and global contexts across the subject matters since our education system mainly advocates subject-centered design at different levels including teacher education. Therefore, not only the curriculum design that match with the policy objectives matter but also training teachers in line with the philosophy of education emphasized in the policy and in the curriculum design chosen to bring the intended outcome in the teaching and learning process effectively. This shows that students` learning not only be affected by the lack of translation of policy statements into curriculum materials and students textbooks but also by the training teachers have and get about their roles and students' learning.

Teachers' Training

In addition to the efforts of individual teachers, according to Lea Filho and O`Loan (1996), teachers should get training on how to integrate and implement EE in their subject areas in both pre-service and in-service programs. They added that the incorporation of EE in these trainings equipped the teachers to:

- examine the major environmental issues from the local, national, regional and international point of view;
- enable students to have a role in planning their learning experiences and provide an opportunity for making decisions and accepting their consequences;
- relate environmental sensitivity, knowledge, problem solving skills and value clarification to every age but with special emphasis on environmental sensitivity to the students` own community;
- help students` discover the symptoms and real causes of environmental problems;
- emphasize the complexity of environmental problems and the need to develop critical thinking and problem solving skills; and

- use diverse learning environments and varieties of educational approaches to teaching and learning about and from the environment focusing on practical activities and firs– hand experience (pp. 5-6).

Above all, teachers are not only trained how to teach EE to develop students` environmental knowledge, skills and attitudes but on how to teach for sustainable development of a given nation (Lea Filho and O`Loan, 1996). Nevertheless, from my personal experience, the place of EE at teacher education, College of Education at Addis Ababa University is negligible. For example, one day, the author was being interviewed as a doctoral candidate by a committee. When one of the committee members asked me my research area, the author told them that it was on 'the practices of EE in Teacher Education in Ethiopia'. The other committee member said, "Join the right department that gives EE." This shows that even some educators do not consider the place and significance of EE in teacher education at graduate program in the right time of addressing problems related to our environment and underdevelopment through education that bases on our environment.

What Research Findings Say on the Practice of Environmental Education in Ethiopia?

Amare and Temechegn (2000, p. 104) assessed the history of education and its role in Ethiopia. They discussed the perception of educators had and have had before and after the New Education and Training policy to the role of education for social and economic development of Ethiopia. Addressing the poor contribution of the curricula material of our education, typically their contents and teaching methods, they reflected their observation as "…creative, innovative and problem–solving graduates were rarely observed in the Ethiopian context." According to the scholars, if education is expected to play its role for the social and economic development of Ethiopia, they recommended that we should: use knowledge for improving the life of the farmers and the urban poor, improve the quality

of textbooks in addressing issues of food insecurity, relate the school curricula to social issues and immediate local concerns, identify the contribution of education to rural and national development, strength the school curricula to provide education that integrates the science-technology-society-environment interface, improve the quality of teaching and learning strategies in developing students` problem solving skills ,and make our education that enable students to appreciate truth, nature and the environment(Amare and Temechegn, 2000). This shows that EE is given little emphasis.

Specifically, Fitzgerald (1994, p. 135) studied the role of EE to overcome problems in relation to famine in Ethiopia. The result showed that the education system influenced the potential of EE "… to reduce people's vulnerability to famine." This was because of the nature of the curriculum (centralized) and the pedagogical training teachers got. On the one hand, being the centralized curriculum was assessed by national examinations; it did not motivate teachers to adapt their contents and teaching methods according to the local context and environment. This encouraged the rote learning of information. On the other hand, the training that teachers got was "academically rather than practically oriented, stressing the academic content of subjects rather than teaching methodologies ….because they have no experience of learning by doing or learning through discussion, project work and so on, they lack the confidence to develop teaching styles which encourage problem formulation and problem- solving skills in their students"(p.125).

Beletu and Yosef (1990) also identified that poor teaching methods, which focused on transmission of facts, were utilized to teach biology and geography before the introduction of EE in some Ethiopian schools curriculum. Hence, they discussed that learning from the environment; problem solving and interdisciplinary ways of teaching were forgotten.

Furthermore, Aklilu (2001) assessed students' awareness and views about natural resource degradation and famine in Ethiopia. In doing so, he used

document analysis and survey taking 433 grade eight and 492 grade 11 students, and 243 trainees from Awassa Teacher Training Institute as a sample from South Nation Nationalities and Peoples Regional State. He collected data from the samples using awareness test and attitude scale, and analyzed using percentage and t-test. The objectives and contents of grade 8-12 geography textbooks, teachers` guides and syllabi were also analyzed. Finally, he found that: objectives developed in the teachers` guides did not address skills for protecting and using natural resources wisely; geography syllabi and textbooks of grade 8-12 did not incorporate environmental problems and issues as they could.

There are also different research outcomes regarding the status and practice of EE in primary, secondary and tertiary levels in Ethiopia.

EE in Primary Schools in Ethiopia

After the introduction of the present Education and Training Policy, Environmental Protection Authority (2003) reported that EE was integrated at primary level first cycle (1-4). Abera (2004) also evaluated the implementation of environmental science syllabi of this level in Illubabur using descriptive survey. In doing so, his data sources were teachers, students, principals, department heads, woreda school supervisors and the region's curriculum experts. From these sources, 706 students and 36 teachers were randomly chosen as a sample. From the sample and key informants (principals, department heads, woreda school supervisors and the region's curriculum experts), the data were collected through questionnaire, observation checklist and interview. The data collected through these instruments were analyzed using chi-square, t-test and percentage. The result showed that teaching methods that are more relevant to environmental science syllabi such as field trip, song, play had been given less emphasis, and most of the teachers (88.2%) did not get pre-service and/ or in- service training to teach the integrated materials.

Moreover, Abishu (2002) tried to assess the place of EE in second cycle primary school curriculum (5-8) in Oromia using descriptive survey and content analysis. To achieve this, his data sources were students, teachers, science, and social study textbooks. Among these, 96 teacher and 73 students, and 50% of the chapters from the textbooks were chosen as sample of the study randomly and purposefully respectively. From these samples, the data were collected using coding sheets, questionnaire, focus group discussion and checklist. The data collected by these instruments were analyzed using percentage. And the result showed that :environmental elements(e.g. vegetation, land, wildlife, air and the interaction of man with natural environment) were found in both textbooks; environmental problems such as clearing of natural vegetation, land degradation, overpopulation and erosion were found in these materials although their degree of presence vary; a particular topic was found in both grade five and six science books, which treated environmental issues; there was no particular topic that treated environmental issues in the social study textbooks; only 33.2% of the evaluation items developed in these materials focused on evaluating environmental knowledge; and only 4.2% o the items could help to evaluate practical activities.

EE in Secondary Schools in Ethiopia

Like at the primary level, there are some researchers conducted on EE or related to EE at secondary level. For instance, Dessalegn (1998) tried to identify students` practice of disseminating EE into the community in East Wollega zone. In his study, he used descriptive survey taking students, homeroom teachers, deputy directors, unit leaders, and EE club leaders of grade 11 in the zone. Among 1111, 233 students were selected based on their grade ten achievement, and all their parents were included in the study. In addition, 23 teachers and the other mentioned sources were taken as a sample and as key informants respectively. The data, from these samples, were collected through questionnaire, interview and documentary analysis. Data collected through these instruments were analyzed using mean, range, percentage, t-test and correlation matrix. His findings showed that the main

sources of EE for students were subjects taught in schools. But these subjects were found having inadequate EE contents that invite field work and students` interaction with the nearby community.

Damtew (2007) also assessed the integration of EE into selected secondary school subjects towards sustainable development. To do so, he chose mixed research design. The data sources were 373 students, 33 teachers, 4 principals, ICDR geography and biology experts, MOE expert, and EPA EE expert, the policy document, grade nine and ten biology and geography curriculum guides and students` textbooks. From these sources, he collected that data through coding sheet, criterion referenced test, Likert-type scale, observation checklist and structured interview. The result of the contents analysis made on grade 9 and 10 biology and geography curricula materials showed that EE objectives (knowledge, skills, attitudes and participation) were not adequately integrated in the curriculum guides of both subjects though knowledge objectives had been given a little emphasis. Objectives related to attitudes explicitly developed in the new education and training policy were unsatisfactorily translated into these materials. The same was true for objectives related to problem solving skills, which were totally forgotten in the materials. Regarding EE contents and teaching methods, only a single unit in each subject and grade level relatively incorporated education about, for, in or from the environment. The evaluation techniques developed in the curricula materials did not match with EE objectives. He also discussed that most of the teachers, who are the main actors in implementing the policy objectives and the curricula materials, did not get training on how to integrate EE into their subject areas.

Asmare (2007) also examined the contribution of EE in raising students' knowledge, attitude and practice in selected first cycle secondary schools. Form the participants, he collected the data using criterion- referenced test, questionnaire and content analysis. The finding from the content analysis depicted that adequate environment related objectives were found in geography subject whereas very few of them were found in chemistry. In both subjects, environmental issues were integrated. However, the contents

in chemistry were poorly related to the nearby environment. He also identified that the integrated curriculum was not able to bring the required knowledge about, positive attitude towards and practice for their environment.

EE in Tertiary Level in Ethiopia

At teacher training level, Melaku (1994) tried to investigate the integration of EE into social study courses in some selected TTIs in Ethiopia. To achieve this objective, he used descriptive survey taking trainees, instructors and social study curricula materials as data sources. From four TTIs chosen purposefully, 321 trainees and all social study instructors were taken as samples of the study. From the samples, data were collected using achievement test, attitude scale, interview and document analysis, and analyzed using percentage, mean, standard deviation, analysis of variance (ANOVA) and inter-correlation matrix. Having analyzed the data, he found that EE was not integrated in line with its objectives and teaching methods; there was no typical topic or EE teaching methods incorporated in geography and history syllabi; almost half of the trainees was found having poor environmental knowledge; and most of the trainees was found having very high favorable attitude to EE, environmental problems and the environment in general.

Taye (2008) researched on Bahir Dar University Students' Environmental knowledge, attitude and practice to assess their environmental literacy. In so doing, he chose mixed method design. And the participants of the study were chemistry, biology and geography department undergraduate students from year I – III in 2007/2008. Form 302 students, he collected the data using questionnaire, achievement test, attitude inventory, interview and focus group discussion. The result showed that the levels of undergraduate students were found having satisfactory environmental literacy according to the non- formal environmental literacy point of view; they were poor in practical action which the key quality of environmental literacy; the

correlation among knowledge, attitude and practice was very low($r < 0.2$); and formal environmental literacy program was not yet established at BDU.

Fisseha (2008) also examined the status of environmental program in Addis Ababa and Jimma Universities. He employed descriptive case study and mixed research concurrent triangulation. From the deans, department heads, instructors and environmental science II year graduate students, he collected data using questionnaire, semi- structured interview and document analysis. Analyzing and interpreting the data, the main findings were sustainable development issues were included in the strategic plan documents of both universities though they did not have environmental policy and coordinator like HIV/AIDS and Gender. However, interdisciplinary teaching approach and curriculum organization were moderately and highly practiced in the universities respectively.

Concluding Remarks

The researches done on EE are encouraging though they are not conclusive at each level in terms of scope, areas (participants, subject matters, curriculum design, teacher education and so forth) research methods and designs. Even, regarding curriculum design and teacher education, there is little investigation on the place of EE in Ethiopian education. The majority of the researches focused on subjects like biology, chemistry and geography. The methods employed were more of survey and the designs are more of quantitative and some mixed ones. The majority also focused on mere inclusion of objectives and contents related to EE, and students' environmental knowledge and attitude. There is no investigation that used qualitative methods and designs. Even the researches done were focused on the inclusion of objectives and contents into different curricula materials. They did not examine whether the contents are integrated into different subject matters as facts or designed to develop students' problem solving and critical thinking skills. In short, the research findings at all levels above showed that EE has been given a little attention in Ethiopian education though the researches were not conclusive in scope and research designs

and methods. Therefore, the role education given in addressing environmental problems and bringing sustainable development of Ethiopia is not encouraging.

Nowadays, it is believed that environmental education plays immense roles to alleviate environmental problems and bring sustainable development of a nation in particular and the globe at large. Environmental education has been given emphasis globally. Therefore, the researcher recommended that:

- our education should be built by including positive experiences of our own past, from the lessons of EE project in Ethiopia and the like;
- the elements of EE stated in the education policy should be incorporated into curricula materials at different levels including teacher education using the right curriculum design.
- contradictions between subject- centered curriculum and integrated designs should be resolved by researching our own practice, sharing and adapting practice from other countries, not through adopting others practice as it is;
- there should be a match among the policy intention, curricula materials, teacher training and the actual teaching and learning process;
- we should change our culture of teaching and learning, from telling and retelling information written in the textbooks to facilitating, thinking and solving environmental problems at local, national and global contexts by relating our education to our environment to bring all-round development of Ethiopia;
- we should research the status and practice of EE in Ethiopian education at different levels intensively using different research approaches;
- above all, to minimize or avoid problems related to the consequences of adopting educational technologies and other teaching and learning approaches that confined both teachers and students in the classrooms by ignoring their real environment, we should develop the

culture of experimenting the technologies and the approaches using small scale project in our real environment and evaluation research rather than adopting them as it is form developed countries.

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