

## **Challenges and Opportunities of Mainstreaming Environmental Education into the Curricula of Teachers' Colleges of Ethiopia**

Daniel Kassahun\*

**Abstract:** One of the cardinal goals of education is to unravel key societal problems. In Ethiopia, challenges arising from environmental degradation, which is partly caused by environmental ignorance, are immense. This paper examines the curricula of two teachers' colleges alongside knowledge and opinion of prospective teachers on local and national environmental issues. A questionnaire was employed to capture the factual knowledge, attitude towards environment, and the readiness of prospective teachers to harness local environmental resources for outdoor teaching. Sample students were randomly selected from the Kotebe College of Teachers' Education and St. Mary's College, Addis Ababa. Comparisons were made along gender, college and enrollment/program categories. The result showed a paradigm shift from "core-biased" to "pedagogical-biased" curricula; a declining trend of outdoor environmental teaching, inadequate environmental knowledge of students, and bleak prospect of their readiness to carryout effective environmental teaching. In general, students belonging to the old curricula were found to be better knowledgeable of environmental facts and more concerned about its degradation than the new curricula students. The study concludes by discussing the implications of mainstreaming environmental issues into the geography curricula and the need to revisit the proportion of course categories in teachers' education.

### **Introduction**

Ethiopia is among the few countries of the world which are in the grip of a whole host of environmental challenges: both in its urban and rural settings. Degradation in the rural areas is mainly caused by unsustainable management of natural resources. The rapid depletion of forests, which ranges from 80,000 to 200,000 ha/annum (EPA, 2003) has drained most of the country's rich and endemic genetic resources. The rate of soil erosion is among the highest in the world, ranging from 42 to 400 tones/ha/annum

---

\* Assistant Professor, Environmental Researcher, Forum for Social Studies, Addis Ababa

(Hurni, 1988). Against the backdrop of rapid population growth, the magnitude of environmental degradation is likely to intensify in the future.

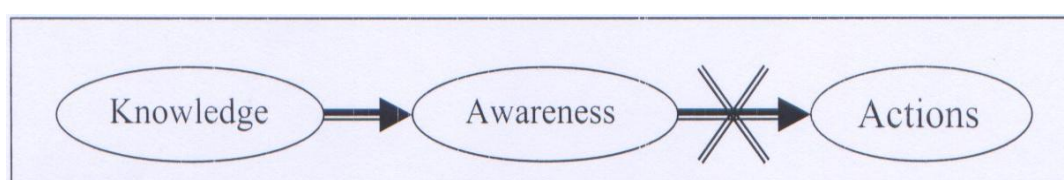
Though urban population in Ethiopia accounts for 15% of the overall population, urban environments have been rapidly deteriorating. Studies in Addis Ababa (Dierig, 1999; Girma, 2004) disclosed that the city has been subjected to various forms of environmental degradation. Substantial segment of households live in a poor sanitation facilities. Bulks of solid waste and industrial effluents are disposed without any treatment. Almost all rivers of Addis Ababa are serving as open sewers and have become the main sources of infectious diseases.

A wide body of research (Dessaegn, 1994; Shibru and Kifle, 1998; EPA 2003; Gedeon, 2003) underscored that lack of environmental awareness is among the top causes of environmental degradation. According to EPA (2003) one of the causes for deep-rooted problems in Ethiopia is lack of environmental awareness especially at the level of decision makers.

Bryant and Hungerford (1977) advocated that attitude towards environment should begin to develop at very early age. As future scientists, policymakers, and consumers, youth could be responsible for “fixing” the environment. Though few they are, scholars in Ethiopia clearly underscored the role of environmental education in achieving sustainable development (Shibru and Kifle 1998) and rehabilitating of the degraded environment (Gedeon, 2003). EPA (2003) reported that environmental education is incorporated into the curricula of grades one to four while it is ignored in higher grade levels.

Arcury (1990) stated that increased knowledge about environment promotes positive attitudes. His concept is crystallized with the finding that awareness, attitude, and participatory action are directly interrelated (Klein and Merritt, 1994; Matthews and Riley, 1995; Kaiser and Gutscher 2003). However, this finding is challenged by the theory which states that awareness does not necessarily lead to environmental behavior (Hungerford and Volk, 1990;

Newhouse, 1990; Jensen and Schnack, 1999; Hsu, 2004). This theory has long been advanced by Finger (1994), who stated that though knowledge is the first step, it is not enough to really change peoples' actions on its own (Figure 1). In this regard, outdoor education could expand learning through increasing the skills acquired by participants. A direct contact and interaction with the study item would, according to Stevens and Richards (1992), actively engage students in an experience that will have real consequences.



Source: Stepath (2004), adapted from Hungerford and Volk (1990)

Figure 1: Model of Linkages between Knowledge, Awareness and Action

It is widely stated that field-based studies provide a valuable role for the integration of theoretical and practical concepts in geography (Haigh, 1986; Lonergan and Andreson, 1988; McEwen, 1996). Abstract concepts, according to Kern and Carpenter (1986), are easier to understand in the field than in the classroom. This assertion is explained by Knapp (1996), with its merit in providing meaningful contextual experiences via complementing and expanding classroom instruction.

In Ethiopia, while environmental problems have been extensively studied since early 1980s, the adequacy and relevance of college curricula for sustainable management of environment have hardly been researched. Exceptions to the rule are the works of Aklilu (2002) and Mulugeta (1992). While Aklilu assessed the views of secondary school teachers and administrators on the protection of natural resources, Mulugeta has appraised the school curriculum from specific aspects of environmental degradation: soil conservation education. Neither of them, however, analyzed the college curricula from the point of environmental knowledge

and perception of prospective teachers. However, the curricula of teachers' colleges could play a vital role in raising the environmental awareness of prospective teachers, which in turn could be translated into sound environmental management in Ethiopia.

This paper explores how the curricula of teachers' colleges are geared to tackle the pressing problem of environmental degradation in Ethiopia. Specifically, the study attempts to appraise the adequacy of environmental topics in the curricula of teachers' colleges; gauge the level of environmental knowledge, awareness and attitudes of college students; and suggest opportunities to mainstream environmental education into the teachers' college curricula.

The study surveyed diploma students of Kotebe College of Teachers' Education (KCTE) and St. Mary's College (SMC). Both colleges produce prospective teachers for grades 5 to 8. The two colleges were chosen based on their pioneer engagement in the training of teachers representing public and private colleges, respectively. Students in these two colleges have come from different parts of the country.

In this study, it is hypothesized that there are significant differences between gender, enrollment type (old vs. new program), and college type (KCTE vs. SMC) when the factual knowledge and opinion of environment by college students are compared. Although samples are drawn from a limited size of population, the results would offer important insights for improving the quality of teachers' education.

## Methods

A questionnaire which consisted of 57 items was developed and completed by sample respondents. The questionnaire was divided into six parts: 1) personal background (eight questions); 2) exposure to outdoor environmental education during college tenure (six questions); 3) environmental problems specific to Addis Ababa city (ten questions); 4) knowledge and perception of environment related institutions in Ethiopia (four questions); 5) knowledge about basic environmental facts and issues (20 questions); and 6) opinion of using the immediate environment of Addis Ababa to carry out outdoor teaching after graduation (13 questions). For those questions aimed at opinions, special care was taken to make the tone as neutral as possible. The questionnaire was prepared in Amharic.

Environmental issues are vast and intricately complex. Therefore, issues raised by the questionnaire were widely circulating environmental facts. It is assumed that the magnitude of environmental awareness students could gain from their colleges could inspire their interest in observing, reading about and listening to a wide ranging environmental issues.

About 88 randomly selected graduating class candidates were interviewed with the permission obtained from respective officials in the two colleges. Special care was made to enable respondents give their own response without consulting their friends or reading materials. Based on the mode of enrollment, sample respondents belong either to the regular or extension categories. Regular students were pre-service trainees. On the contrary, most of the extension students were in-service trainees, who were engaged in a daytime teaching at various elementary schools in the city. The survey was conducted during the transition period of the educational system, i.e., from the old to the new curricula. As a matter of fact, the regular programs belonged to the old curricula (called Geography stream) while the extension students belong to the new curricula (called Social Science stream). In addition, department heads and selected instructors of the Geography/Social Science were interviewed at both colleges.

The questionnaire survey was conducted on a sample size ranging from 50% -80% of the total population in KCTC and SMC, respectively. Table 1 gives the distribution of participants by college, enrolment, and gender. Respondents were predominantly of males. When enrolment type is considered, respondents from the extension program outnumbered their regular counterparts.

**Table 1: Distribution of Survey Participants by Gender and Program (% in Parenthesis)**

	<b>Variable</b>	<b>SMC(n=44)</b>	<b>KCTE(n=44)</b>	<b>Total(n=88)</b>
<b>Gender</b>	Male	30(68)	35(79)	65(74)
	Female	14(32)	9(20.4)	23(26)
<b>Program</b>	Regular	7(15.8)	29(66)	36(41)
	Extension	37(84)	15(34)	52(59)

The responses to the questionnaire were analyzed considering college types, gender, and enrollment types as independent variables. Descriptive statistics was used to summarize the data obtained through the questionnaire. T-test was used to determine whether there were statistically significant differences among variables (male vs. female; SMC vs. KCTC; Regular vs. Extension). A significance level of  $p < 0.05$  was used in the analysis.

To analyze the college curricula, courses taught in the department of Geography/Social Science were grouped into three categories: core (major), pedagogical (professional), and common (supportive) courses. Core (major) refers to courses that address the central theme of a given field of specialization. Pedagogical (professional) refers to course that equip prospective teachers with strategies, techniques, and approaches of teaching the core knowledge the specialization. Common (supportive) refers to courses that are general in their nature and useful for enriching the academic horizon of college students.

To conduct objective comparison of course proportion across time, the percentage share of each category was computed from the total credit hours of the diploma programs. This computation was undertaken for the three key periods, viz., pre-1998, 1998-2003, and post 2003. The course composition of the pre-1998 goes as far as late 1970s. On the contrary, the post 2003 belongs to the most recent education policy. The 1998-2003 curricula look a precursor of transition to the new education policy.

## **Results and Discussion**

### **Assessment of College Curricula**

Analysis of course types in the two colleges of teacher education illustrates that significant change was observed in the proportion between core courses, pedagogical courses, and common courses. In response to changes in the education policy, the balance between the three categories has shifted significantly. Table 2 shows how the proportion of core course category has been declining across changes in the educational policy. In the most recent curricula, for instance most of the core courses were trimmed off. It is crystal clear that most core courses in geography stipulate the need to expose students to practical or outdoor observation.

**Table 2: Patterns of Major Courses in the Diploma Programs of Teachers' Colleges**

<b>Before 1998</b>	<b>1998-2003</b>	<b>After 2003<sup>2</sup></b>
Int. to Geography of Ethiopia	Int. to Geography of Ethiopia	Social Studies I
Int. to Economic Geography	Int. to Economic Geography	Social Studies II
Landform Geography	Landform Geography	Social Studies III
Int. to Climate	Int. to Climate	Social Studies IV
Resource Analysis	Resource Analysis	
Geography of Population	Geography of Population	
Geography of Africa	Geography of Africa	
Map Reading	Map Reading	
Biogeography	Survey of World Geography	
Economic Geography of Ethiopia		
Geography of Transport		

The declining activity of outdoor environmental education could be portrayed through the phenomenal transition from one extreme of “core course bias” to the other extreme of “professional course bias” (Figure 2). In the old curricula, for instance, there were wider opportunities for undertaking outdoor environmental education. The newly introduced system, on the contrary, has given the lion share of its space to the teaching practice, which is apportioned at the expense of several core courses. The new teachers' education policy underscores the need to excessively expose candidates to the teaching learning environment.

<sup>2</sup> This is a 10+3 Program which was launched under the new educational policy



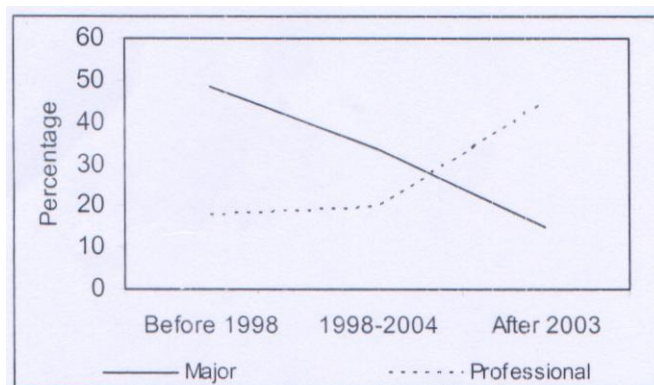


Figure 2: Major-to-professional Proportion of Courses across Different Periods in the Teachers' Colleges, Diploma Program

Information gathered through instructors' interview revealed that significant changes took place in the new curricula. The change is vivid in terms of the breadth and depth of outdoor environmental education. In the old curricula, students used to travel long distances and presented with a great deal of knowledge from different geographical sites. According to the information obtained from department heads, factors responsible for the plummeting of outdoor environmental education are: (1) the dominance of pedagogical courses in the college curricula at the expense of core academic courses; and (2) the growing cost of logistical and financial resources to move students out of campuses.

In KCTE, for instance, the Department of Geography had a good track record of taking students up to 700 km from the College. Instructors recalled that such practices were instrumental in linking most of the theoretical knowledge in the classroom with real problems of the environment in the field. It was also helpful in sensitizing college students for conservation and sound management of the environment. Similarly, SMC had the privilege of undertaking several outdoor sessions in the early period of the program. Such an outdoor educational trip has dramatically declined upon the implementation of the new curricula in both colleges. Interviewed instructors

have the opinion that the tradition of outdoor environmental education could revive if the composition of course categories is fairly balanced.

If the new system of teachers' education is evaluated from the point of producing environmentally active geography teachers who are responsible for tackling the critical problem of the country, it would fall far from meeting the expectation. The issue hinges on a delicate balance. This is because when government decided to bestow higher priority to professional courses, the objective was "to meet the national interest"- i.e., producing teachers with "adequate" pedagogical skills. In return, the policy interdicted several core courses. Both in the past and in the present, the composition of college curricula have been too polarized and were driven by a single criterion than a multiple and competitive criteria. As a result, the curricula of Teachers' Colleges have voyaged from one extreme to the other, leaving negligible room for a trade-off.

### **Analysis of Knowledge and Attitude of Students**

Close to 70% of respondents have lived in Addis Ababa for over five years and about 45% of them were born in the city. All respondents have lived in the city, for at least two years. Because of this all are quite familiar with the various environmental problems of the city. Comparatively, students in the extension program lived longer years in the city than the regular students. Overall, less than 33% of the respondents had prior involvement in environmental clubs during their secondary school education. However, only 7% of them had the experience in out-of-campus environmental program prior to their college tenure. In the following subsections, the factual knowledge, attitude towards environment and attitude towards harnessing local environment for outdoor education will be presented.

### **Assessment of Factual Knowledge**

Overall, the factual environmental knowledge of the respondents was moderately low (Table 3). For example, only slightly over a half of the students correctly estimated the percentage of solid wastes collected by the city municipality. This question was better answered by male students than females ( $0.57 \pm 0.12$ ,  $p=0.045$ )<sup>2</sup>; and college wise, students from KCTE made better estimate ( $0.57 \pm 0.21$ ,  $p=0.039$ ) than the SMC students. However, no difference was noted with respect to the enrolment type ( $0.57 \pm 0.41$ ,  $p=0.063$ ). The situation in Addis Ababa is that a total of 0.22 kg/capita/day or 851 tones/day dry wastes are generated but only less than 65% is collected by the municipal. The remaining 35% is disposed off through informal means. Around the rivers of the city one can easily observe a large pile of waste materials dumped especially during evenings.

Knowledge pertaining to the country's environmental policy by sample students has been found generally weak, showing their low level understanding of the policy. Over half of respondents did not know about it. The National Policy and Strategy on Environmental Management and Protection of Ethiopia, which outlines the objectives and strategies by taking into account the prevailing economic, social and cultural situations, was formulated in 1997. Failure to recognize such basic framework put most respondents in the darkness of policy framework upon which they are supposed to operate outdoor environmental activities.

Similarly, about 70% of the respondents do not know if the constitution of the country has articles in relation to environment. Articles 44 and 92 of the Ethiopian Constitution state that all citizens have the right to live in a clean and healthy environment, and government and citizens shall have a duty to protect the environment. In this regard, evening students showed significantly better ( $0.31 \pm 0.13$ ,  $p=0.045$ ) responses than regular students. However, the responses did not differ along college type ( $0.31 \pm 0.43$ ,  $p=0.052$ ) and gender ( $0.31 \pm 0.53$ ,  $p=0.059$ ).

---

<sup>2</sup> Numbers in the parenthesis shows mean, standard deviation and calculated t-test value, respectively

**Table 3: Selected Questions of Factual Knowledge on Environmental Issues**

Questions	Percent correct				College	Gender	Program
	SMC (n=44)		KCTE (n=44)				
	Rg	Ex	Rg	Ex			
What percentage of solid waste is uncollected by Addis Ababa city?	61	58	63	46	*	*	NS
Do you know about the Ethiopian Environmental Policy?	55	51	43	44	NS	*	*
Is environmental issues reflected in the Ethiopian Constitution?	22	36	31	38	NS	NS	*
In which season does malaria proliferates in Ethiopia?	61	76	70	78	NS	*	*
What percentage of Ethiopian landmass is covered by forests?	68	80	62	76	*	NS	*
What chemical compound is responsible for ozone depletion?	23	18	11	14	NS	*	*
What are the two water borne diseases?	58	71	51	59	NS	*	*
Mention two industries that pollute air in Addis Ababa	71	75	69	76	NS	*	NS
Mention two industries that pollute water in Addis Ababa	80	86	69	84	*	*	*

Results of analysis: \* =  $p < 0.05$ ; NS = not significant; N=88; Rg = regular program; Ex = extension program.

While the nations' forest coverage has been a widely cited figure in various media outlets, close to 30% of the respondents have incorrectly answered it. The forest coverage of Ethiopia has rapidly declined from close to 50% at the turn of the century to the present 2.9%. Results of the analysis showed that there are significant differences along gender and college types. While female respondents were more knowledgeable ( $0.71 \pm 0.62$ ,  $P=0.012$ ) than males, respondents from SMC were more exact ( $0.71 \pm 0.19$ ,  $P=0.043$ ) than KCTE's respondents. The fact that female students are more knowledgeable of forest resources could play a role in reinvigorating the ongoing weak afforestation activity in the country. In this regard, further research on the

issue could generate useful information to shape the admission policy of geography departments through affirmative action.

With respect to ozone depletion, about 83.5% of respondents were unable to answer the correct causes. However, ozone depletion has been a hot issue widely publicized by the media outlets. It is also included in several academic subjects. It is the chlorofluorocarbon (CFC) compounds that destruct ozone layer in the atmosphere. While there were no significant differences along college ( $0.18 \pm 0.43$ ,  $P=0.062$ ) and gender ( $0.18 \pm 0.23$ ,  $P=0.053$ ), respondents of the old curricula were found significantly more knowledgeable ( $0.18 \pm 0.32$ ,  $P=0.032$ ) than respondents of the new curricula. However, compared to most questions of environmental facts, respondents were good enough to correctly name industries which are blamed to pollute the air and water resources of Addis Ababa.

### ***Attitudes towards environment***

In order to position the relative importance of environmental vis-à-vis other societal issues (i.e., crime, addiction to chat/drug, illiteracy, health, income disparity, unemployment, democracy) students were asked to indicate the level of agreement or disagreement on five item scale (1 = highly crucial, 2 crucial, 3 moderately crucial, 4 = insignificantly critical and 5 = not critical). While SMC respondents put crime as the most critical of all, respondents of KCTE placed it at the fifth rank (Figure 3). Unemployment was cited as the most important issue by KCTE respondents. However, concern for environment was ranked sixth. The response obtained from senior geography student is very strange. It indirectly shows the gravity of the problems that emanates from environmental degradation is not adequately appreciated when compared to unemployment, crime, democracy, addiction to chat and health related problems.

Q. What is the most important problem of Ethiopia?

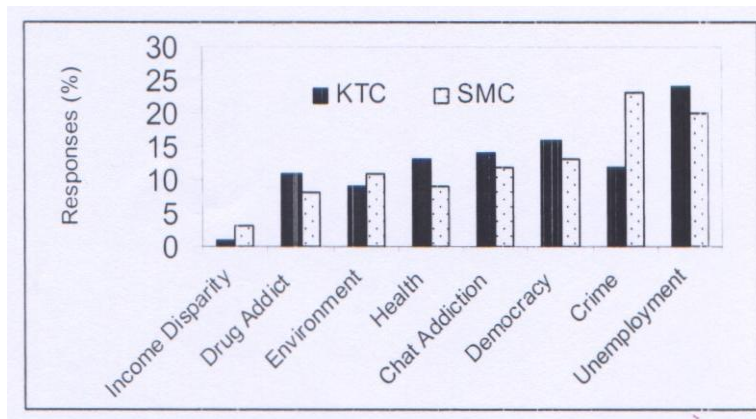


Figure 3: Critical Problems of Ethiopia as Rated by Sample Students

When students were asked to rate the state of environmental degradation in Ethiopia, about 34% of them put it as a “serious” problem; 26% of them as a “very serious”, and 6% of them as a “not a serious’ problem. Though the rating is low, the respondents’ concern for the seriousness of environmental problem (Figure 4) exhibited their understanding of the threat of environmental deterioration in the country.

Q. How do you express the Ethiopian environmental problem?

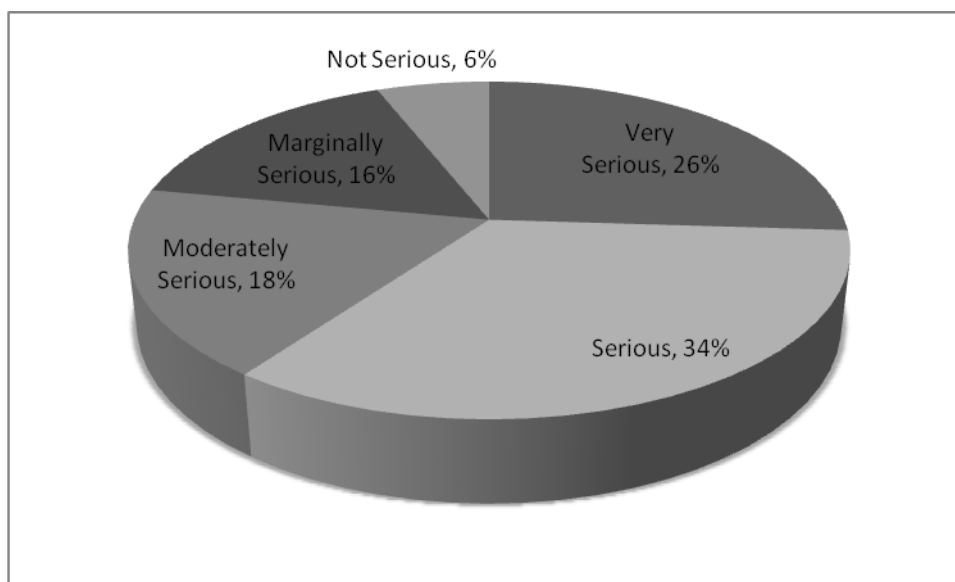


Figure 4: Seriousness of Environmental Problems in Ethiopia as Reported by Sample Students

The fact that approximately three-quarters of students shared the opinion: “there are ample expandable agricultural lands” in Ethiopia (Table 4) shows a mistaken myth which conforms to the opinion of most rural population in Ethiopia. Such a notion has partly drove farmers to clear more and more forest lands to undertake agriculture. In reality, however, the rapid population growth in Ethiopia, which is close to 3% per annum, is creating huge pressure on the agricultural land. Most lands, which are suitable for crop cultivation, are already under the possession of farmers and most of the remaining unoccupied lands are either unsuitable for subsistent agriculture or they require huge technological investment. Especially in the highland parts of the country, where population pressure is intense and land productivity has exhausted, landless young farmers would be forced to colonize marginal lands which are susceptible to rapid degradation processes.

**Table 4: Percentage Views on Aspects of the Environment by Respondents**

Statement Number	(I)	(II)	(III)	(IV)	Total	I+II	III+IV
	SA	MA	DA	SDA	N=88		
1	44	31	19	6	100	75	25
2	17	18	27	38	100	35	65
3	53	23	15	9	100	76	24

STATEMENT 1: "In Ethiopia there are ample expandable agricultural lands".

STATEMENT 2: "Forest degradation problem could easily be solved through afforestation".

STATEMENT 3: "Rapid population growth has a strong impact on environmental degradation"

Where SA= Strongly Agree; MA=Moderately Agree; DA=Disagree,' SD= Strongly Disagree

Over 35% of the respondents have the idea that "afforestation can replace the merit of natural forests". Such distorted belief could encourage people to cut more trees with a pretext of replanting them. However, tree planting is not as diverse as the original forest and records in Ethiopia show discouraging success rate. It is encouraging to know that over three-quarters of students appreciate the pressure of rapid population growth on the delicate environment.

### ***Attitudes towards teaching environmental education***

The majority of responding students are quite aware of the suitable period for undertaking hands-on afforestation and water-induced soil erosion education in Addis Ababa (Table 5). This could be attributed to the wide media coverage during summer (kiremt) season in Ethiopia, where hundreds of thousands of seedlings are planted in the country each year. Students of



the two enrollment categories varied significantly in the correctness of their awareness to the questions outlined in Table 5. In answering these two questions, extension students excelled their regular counterparts ( $0.89 \pm 0.16$ ,  $p=0.034$ ) for the attitude towards suitable months of teaching onsite afforestation and ( $0.91 \pm 0.01$ ,  $p=0.017$ ) for the suitable months of teaching onsite soil erosion. This significant difference could be attributed either to their exposure to day time work or to the type of curriculum they are enrolled in, which is the old one. It is to be remembered that the old curriculum does have a wider room for core courses which are embedded with outdoor educational trips.

**Table 5: Attitudes of College Students towards Action Oriented Teaching after Graduation**

Question	Percent correct				College	Gender	Program
	SMC		KCTE				
	Rg	Ex	Rg	Ex			
Suitable months to teach onsite afforestation	87	93	90	91	NS	NS	*
Suitable months to teach onsite soil erosion	78	94	93	89	NS	*	*

Results of analysis: \* =  $p < 0.05$ ; NS = not significant; N=88; "Rg" and "Ex" are regular and extension programs.

Table 6 shows that a substantial number of respondents have little appreciation for the suitability of the Addis Ababa environment to undertake outdoor environmental teaching. However, it is easy to recognize that the city is endowed with abundant sites of exposed rocks and soils. Responses related to the possibility of teaching about rocks in the field condition showed significant variations among college, gender and enrolment/program types. While SMC are found more optimistic than KCTE, students enrolled in extension program, in general, are more optimistic than students of regular program. There were no clear differences among male and female category.

The variation in line with college type could be partly explained by differences in the core course instructors' personal interest.

**Table 6: Percentage Views of Sample Students on (the Adequacy and Suitability of the Addis Ababa City to Practically Teach Aspects of Environment.**

	Yes	No	Not sure	Total(88)
Rocks	34	42	24	100
Soils	39	31	30	100
Water population	28	43	29	100
Waste management	61	27	12	100

With respect to soils, stark differences were observed across college, gender and enrolment types. While KCTE respondents are more optimistic than SMC respondents, females are more optimistic than males. With respect to enrolment, extension students are more optimistic than regular students.

Students were asked to express their view on the adequacy of their acquired environmental knowledge to effectively teach in grades 5-8 after graduation (Figure 5). With the exception of regular students of SMC, the majority of the students (i.e., over 50%) feel comfortable to effectively carryout outdoor education once they started teaching. However, still substantial proportion of students (i.e., over 40%) experienced uneasiness to effectively teach environmental education. This finding gives a good vantage point for policy makers to revisit the content and adequacy of environmental education delivered in teachers' colleges.

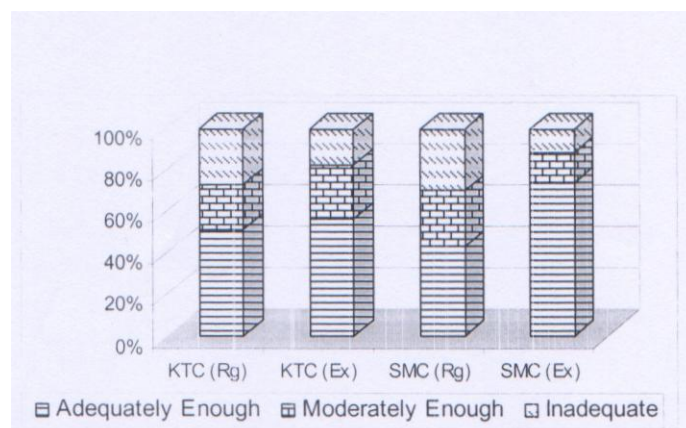


Figure 5: Views of Students on the Adequacy of their College Curriculum to help them Teach Environmental Education in Grades 5-8 after Graduation.

## Conclusion

This study has emanated from the premise that teacher training colleges can play a pivotal role in inculcating the importance of suitable environment education in the mindset of younger generation. It was presumed that curricula of geography courses in the teachers' colleges could produce environmentally-active teachers who, in turn, are responsible to educate future citizens- who can manage their environment in a sustainable manner. However, research on the issue has been very scarce, if not totally absent. This study has attempted to fill this gap through analyzing the old and the new curricula of teachers' colleges along with the environmental knowledge, attitude and opinion of attending in these colleges.

Though the study is based on students drawn only from two colleges, the results are consistent with many previous studies (Arcury et al. 1987; McEwen 1996; Holl et al 1995; Hsu 2004), which reported the inadequacy of factual knowledge by the candidate teachers. This implies that the curricula in the teachers' colleges are not enough to tackle the critical problem of the country, i.e., the ongoing rapid environmental degradation. This lacuna is a source of worrisome upon knowing that the respondents were senior students of the colleges.

The fact that most of the immediate environmental resources are unutilized by both colleges witnesses the existing weak linkages between the curricula and the environment. With respect to the content of the curricula, the attention given to environmental education has been rapidly shrinking. The change took place due to the increased attention given to 'prioritized' pedagogical subjects, which took place at the expense of core courses.

In order to address the diverse, complex and dynamic needs of the society, two important measures need to be urgently taken, viz., reviewing the composition of course categories from multiple vantage points, and in the mean time, mainstreaming outdoor-oriented environmental education in the existing academic programs. Such measures could be executed through (1) equipping college instructors with skills pertaining to the harmonization of classroom and outdoor education; and (2) forging partnerships between teacher colleges and other institutions (e.g., grassroots civil society and advocacy organizations) with valuable environmental expertise. Such measures would boost the environmental awareness of prospective teachers and play a crucial role to curb the ongoing environmental degradation in Ethiopia.

## References

- ADEA (Association for the Development of Education in Africa). (2002). *Special Issue: Reaching Schools: Where Quality Starts*. **ADEA Newsletter**, 14 (3).
- Aklilu Dalello (2002). *Educators' Views about the Use and Protection of Natural Resources in Ethiopia: The Case of Teachers and School Administrators*. **The Ethiopian Journal of Education**, 18 (2): 41-62.
- Arcury, T., Scollay, S. and Johnson, T. (1987). *Sex Differences in Environmental Concern and Knowledge: The Case of Acid Rain*. **Sex Roles**, 16: 463-472.

- Arcury, T. (1990). *Environmental Attitude and Environmental Knowledge*. **Human Organization**, 49 (4): 300-304.
- Bryant, C. and. Hungerford, H. (1977). *An analysis of Strategies for Teaching Environmental Concepts and Values Clarification in Kindergarten*. **Journal of Environmental Education**, 9(1): 44-49.
- Dessalegn Rahmato (1994). *Land policy in Ethiopia at the Cross Roads*. In *Land Tenure and Land Policy in Ethiopia after Derg*. Edited by Dessalegn R., Proceedings of the Second Workshop of the Land Tenure Project. Working Papers on Ethiopian Development No. 8. Addis Ababa.
- Dierig, S. (1999). *Urban Environmental Management in Addis Ababa: Problems, Policies, Perspectives, and the Role of NGO's*. **Hamburg African Studies**, 8.
- EPA (2003). *State of Environment Report for Ethiopia*. The Federal Democratic Republic of Ethiopia, Environmental Protection Authority (EPA).
- Finger, M. (1994). *From Knowledge to Action? Exploring the Relationship between Environmental Experiences, Learning, and Behavior*. **Journal of Social Issues**, 50 (3):141-160.
- Gedeon A. (2003). *Program Brief and Introductory Remark*. *Environment and Environmental Change in Ethiopia*. Forum for Social Studies, Civil Society and Environmental Policy Dialogue. Consultation Paper on Environment, No. 1:4-8.
- Girma Kebede (2004). *Living With Urban Environmental Health Risks: The Case of Ethiopia*. King's SOAS Studies in Development Geography.
- Haigh, M. (1986). *The Evaluation of an Experiment in Physical Geography Teaching*. **Journal of Geography in Higher Education**, 10: 133-147.

- Hsu, S. (2004). *The Effects of an Environmental Education Program on Responsible Environmental Behavior and Associated Environmental Literacy Variables in Taiwanese College Students*. **Journal of Environmental Education**, 35 (2): 37-48.
- Holl, K. D., Daily, G. C. and Ehrlich, P.R (1985). *A Survey of Knowledge and Perceptions in Costa Rica Regarding Environment, Population and Biodiversity Issue*. **Conservation Biology** 9: 1548-1558.
- Hungerford, H., and Volk, T. (1990). *Changing Learner Behavior through Environmental Education*. **Journal of Environmental Education**, 21(3): 8-21.
- Hurni, H. (1988). *Degradation and Conservation of Resources in the Ethiopian Highlands*. **Mountain Research and Development**, 8(2/3): 123-130.
- IBE (2001). *The Development of Education*. National Report of Ethiopia by Ethiopian National Agency for UNESCO. March 2001. International Bureau of Education.
- Jensen, B. and Schnack, K. (1999). *Action Competence Approach in Environmental Education*. **Environmental Education Research**, 3(2): 163-178.
- Kaiser, G. and Gutscher, H. (2003). *The Proposition of a General Version of the Theory of Planned Behavior: Predicting Ecological Behavior*. **Journal of Applied Social Psychology** 33(3): 586-603.
- Kern, E. and Carpenter, J.(1986). *Effect of Field Activities on Student Learning*. **Journal of Geological Education**, 34:180-183.

- Klein, E. and Merritt, F. (1994). *Environmental Education as a Model for Constructivist Teaching*. **Journal of Environmental Education**, 25(3): 14-21.
- Knapp, C. (1996). Just Beyond the Classroom: Community Adventures for Interdisciplinary Learning. Charleston, WV: ERIC Clearinghouse on Rural Education and Small Schools (ERIC Document Reproduction Service No. ED 388 485).
- Lonergan, N. and Andersen, L. (1988). *Field-based Education: Some Theoretical Considerations*. **Higher Education Research and Development**, 7: 63-77.
- Matthews, B. and Riley, C. (1996). *Teaching and Evaluating Outdoor Ethics Education Programs*. Vienna, VA: National Wildlife Federation. (ERIC Document Reproduction Service No. ED 401 097).
- McEwen, L. (1996). *Fieldwork in the Undergraduate Geography Program: Challenges and Changes*. **Journal of Geography in Higher Education**, 20: 379-384.
- Mulugeta Tesfaye (1992). *Soil Conservation Education in the Ethiopian Regular School Program*. In *Soil Conservation for Survival*, edited by Kebede T. and Hans, H.
- Newhouse, N. (1990). *Implications of Attitude and Behavior Research for Environmental Conservation*. **Journal of Environmental Education**, 22 (1): 26-32.
- Roll, K., G. et al (1999). Knowledge of and Attitudes toward Population Growth and the Environment: University Students in Cost Rica and the United States. **Environmental Conservation**, 26(1): 66-74.

Shibru Tedla and Kifle Lemma (1998). *Environmental Management in Ethiopia: Have the National Conservation Plans Worked?* OSSREA Environmental Forum Publications Series, no. 1. Addis Ababa: OSSREA, 1998.

Stepath, P. (2004). Awareness and Monitoring in Outdoor Education. Paper presented to the Tropical Environment and Geography Conference, James Cook University-Cairns, Queensland, Australia, June 7, 2004. (ERIC Document Reproduction Service No. ED494949).

Stevens, P. and Richards, A. (1992). Changing Schools through Experiential Education. **ERIC Digest**, ED345929, March 1992.

TGE (1994). *Education and Training Policy*. Transitional Government of Ethiopia.