Environmental Knowledge, Attitude and Participatory Behavior towards Land Degradation in Injibara Secondary and Preparatory School, Northwestern Ethiopia

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Abstract
The study investigates the level and relationship of environmental knowledge, attitude and participatory behavior among study participants towards land degradation. A total of 286 study participants take part in the study. They were assessed using the Likert scale for environmental attitude and participatory behavior and multiple-choice for environmental knowledge. In addition, to strengthen the data obtained through questionnaire, Focused Group Discussions and interview were used and the data obtained analyzed using SPSS version 15.0 for windows. The result of the study communicates that both students and teachers have fair level of environmental knowledge, attitude and participatory behavior towards land degradation. Furthermore, results of correlation and linear regression revealed that there is a significant moderate positive bivariate correlation and positive predictive power among environmental knowledge, attitude and participatory behavior across students and teachers.
Keywords: Knowledge, Attitude, Participatory Behavior, Land Degradation, Bivariate Correlation, Predictive Power.

1. Introduction

We are living way beyond the planet's means by relentlessly reaping the planet's resources that, by the year 2050, we will need an equivalent of two planets worth of natural resources in order for the population to survive. Environmental problems are caused by the current patterns of production of industries, patterns of consumption and behavior of consumers. The shaping of knowledge, attitude and value, commitment and skill needed to preserve and protect the environment begins at the early age. Hence, educators play an influential role in developing new pattern of knowledge, attitude and behavior in individuals which can be achieved through environmental education (Said *et al.*, 2003; Yavets *et al.,* 2009). Education is a key factor in developing public knowledge and awareness about issues that affect the future of a nation and, subsequently, the world. Environmental problems have become issues of great concern to many parties. A concern for the environment has now become part of the concept of sustainable development. Education for Sustainable Development (ESD) as proposed by the United Nations has come to mean "education to enable sustainable development" (Zakri, 2006; UNESCO, 1980; Roth, 1992).

It is assumed that scientific knowledge may increase awareness of implications of scientific developments for the environment and the problems it may cause. Also it increases people's knowledge of the limits of science and technology in providing solutions to these problems. The more people know, the more they will be interested in and concerned about their environment (Durant et al. 1989). Science-based knowledge of environmental issues, according to Rickinson (2001), develops through informal sources such as personal observations and media. Environmental attitude of young people appears to be crucial as they ultimately play a direct role in providing knowledge-based solutions to in- coming environmental problems (Bradly et al., 1999; Eagles and Demare, 1999). Furthermore, school environmental program, although addressed to students can also influence upon the environmental knowledge, attitude and behavior of adults (parents, teachers and local community members) through the process of intergenerational influence (Evans et al., 1996; Ballantyne, 1998; Gallagher et al., 2000). Environmental degradation varies across places in the world. Accordingly, in developed world the major environmental degradation mostly are pollution, toxic and other wastes, and loss of biodiversity which resulted from rapid urbanization and industrialization. However, the most common environmental degradation problem in developing countries like Ethiopia is the degradation of land which mostly resulted from lack of structured sustainable agricultural and economic activity (Adams, 2001; Ramlogan, 1997; Aydin, 2010).

Many survey studies have been conducted on environmental awareness, attitude and behavior in different countries by focusing their own environmental problems. The results show, educators have low to moderate level of understandings of environmental issues. They are just experiencing the problems of environmental degradation such as pollution, erosion, deforestation problem but their knowledge and awareness are not up to the level to think about adverse long time effect of this degradation on national economics and their life (Aklilu

2001). Hence, this study is conducted to investigate the level of environmental knowledge, attitude and participatory behavior and relationship between environmental knowledge, attitude and participatory behavior towards land degradation among study participants of Injibara Secondary and Preparatory School.

2. Objective of the Study

This study is aimed to assess the level of environmental knowledge, attitude and participatory behavior among study participants, the relationship between environmental knowledge, attitude and participatory behavior towards land degradation. Within the framework of this overall objective, the following questions guided this study: what is the level of environmental knowledge, attitude and participatory behavior possessed by study participants, what type of relationship exist between environmental knowledge, attitude and participatory behavior towards land degradation and is environmental knowledge predicts or not environmental attitude and participatory behavior towards land degradation?

3. Materials and Methods

This study follows cross-sectional survey research design with quantitative and qualitative research methods in order to study the level and relationship exist between environmental knowledge, attitude and participatory towards land degradation.

3.1. Participants

The target population under study is divided in strata based on education level (secondary and preparatory students and teachers), academic stream (social science and natural science), grade level (9, 10, 11 and 12) and gender (male and female). The number of subjects selected from these different strata is proportional to the total number of subjects in each stratum except for teachers which are selected based on their accessibility or availability by using convenience purposive sampling. Accordingly, a total of 286 study participants which 234 are secondary and preparatory students and 52 are secondary and preparatory teachers participated in the study as shown in table 1.

Table 1: Distribution of Sampled Students and Teachers for the Study based on Grade Level, Gender, Academic Stream and Educational Level

Grade level		Number of students		Number of teachers		Number of sampled students based on their proportion(0.067)		Number of teachers sampled based on convenience	
		Male	Female	Male	Female	Male	Female	Male	Female
Grade 9		642	653	38	6	43	44	6	6
Grade 10		557	573	34	8	37	38	6	6
Grade 11	NS	203	119	13	4	14	8	4	3
	SS	106	103	10	4	7	7	4	4
Grade 12	NS	252	103	12	3	17	7	4	3
	SS	93	97	11	4	6	6	4	2
TOTAL		1853	1648	118	29	124	110	28	24
		3501		147		234		52	
		3648				(234+52)=286			

Source: Injibara secondary and preparatory school record office, 2011

3.2. Instrument

This study incorporated qualitative data from interviews, focused group discussions and open-ended questions to enrich the quantitative data obtained from multiple choice knowledge tests and attitude and behavior Likert scale items which are used as the main data gathering instrument in this study. Data collection instruments were piloted to check their internal consistency. In this respect, the instruments were given to professionals in the field to judge the content validity and revisions were made based on their comments and suggestions. Besides, the tests were distributed to thirty subjects; twenty grade twelve students and ten teachers of secondary and preparatory school. Moreover the analysis of the pilot data was made to examine the relevance of each item to answer the research question. The internal consistency of the scale was found to be 0.78, 0.75 and 0.76 respectively for knowledge, attitude and participatory behavior items using Cronbach's alpha.

3.3. Data collection and analysis

After collecting knowledge, attitude and behavior inventory questionnaire, the researcher conducted FGDs that contain 1 male and 1 female student from grade 9, 10, 11 and 12 for 2 hours in two sessions (1 hour for each session) which are selected with the support of room teachers. Due to limited time to conduct other type of interview, the researcher interviewed eight teachers through structured interview.

The survey questionnaire knowledge test has four choices and the correct responses were assigned a score of one and incorrect responses as a score of zero. The lowest possible total score is zero and the highest total score is 26 (26 x 1)[1] which is changed out of 100% for comparison convenience. Accordingly when the participants scored for instance 26, 20, and 15 it is scored as 100, 77 and 58 respectively.

To identify students' attitude concerning land degradation issues a standardized Likert type of scale was employed. Likert scale applies scales ranging from strongly agree to strongly disagree. There were 21 items presented to measure students' and teachers' attitude which some of the items forward definite favorableness while the remaining items forward definite unfavorableness. In assigning values to favorable items the scale were weighted going from strongly agree, agree, undecided, disagree, strongly disagree, having 5, 4,3,2,1 values respectively. But, in the case of unfavorable items these values were reversed in the scale strongly disagree, disagree, undecided, agree, strongly agree, having 5, 4,3,2,1 values respectively.

Twenty participatory behavior inventory items written on a five point Likert scale was used to measure students' and teachers' participatory behavior or willingness to reduce and tackle the problem of land degradation to improve the environment. The scale employs five point Likert scales, ranging from strongly agree to strongly disagree. In this scale some of items were worded to show positive values whereas others were worded to show negative value. For the positive items value was assigned 5,4,3,2 and 1 for strongly agree, agree, undecided, disagree and strongly disagree and this value was reversed for negative value items.

To analyze and interpret data gathered from the questionnaires were tabulated, analyzed and interpreted by using SPSS version 15.0 for windows. In order to analyze the data, appropriate descriptive statistical tools such as percentage, frequency table, standard deviation, mean, and inferential statistics of linear regression and Pearson's correlation coefficient were used. Mean and standard deviation as well as percentage and frequency table are used to investigate average scores with respect to the variables under investigation while correlation coefficient were used to examine the relationship among respondents environmental knowledge, attitude and participatory behavior while linear regression is used to examine whether respondents knowledge predicts their environmental attitude and participatory behavior. Moreover, students' and teachers' environmental knowledge, attitude and participatory behavior towards land degradation which is obtained from open-ended questions, interviews and focused group discussions are analyzed thematically in a qualitative way.

4. Results and discussion
4.1. Level of Environmental Knowledge, Attitude and Participatory Behavior

To assess students' and teachers' environmental knowledge about causes, consequences and possible solution for land degradation 26 items which are changed out of 100% for computing convenience are used. As shown in table 2 the average score of environmental knowledge about land degradation for students and teachers are (66.8) and (75.9) respectively. The majority of students (70%) and more than half of teachers (57.6%) score above average which shows their environmental knowledge about the causes, consequences and possible strategies that are important to reduce and tackle the problem are promising.

Although more than half of teachers and students score above average, as compared with students who majority (70%) of them scored above average, it is half of teachers score above averages who are the main agents of educational process. From this one can conclude that teachers possess the lower environmental knowledge than students. This result is similar with the findings of (Atlabachew, 2007) which reports that both university learners and academic staffs hold improper environmental knowledge.

To evaluate students' and teachers' environmental attitude towards land degradation 21 items are used. In order to decide whether the students have positive or negative attitude towards land degradation, it needs to have a

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[1] Environmental knowledge test scored out of 26, but for the sake of comparison convenience it is changed to 100%.

dividing line. With regard to this, using the score allotted to "undecided" as a dividing line, the attitude one has can be categorized as favorable or unfavorable. Accordingly, the average score is 63 (3x21) when average equals 3.0 on the scale which is a neutral position. Accordingly, score greater than 63 are considered as positive attitudes and score less than 63 implies negative attitudes towards land degradation.

As can be seen from table 2 the mean score of the students and teachers are 78.9 and 87.4 respectively; more than half of students (51.1%) and teachers (55.7) scored above mean. From this one can deduce that both groups have positive attitude towards land degradation and related environmental problems. The finding of the study is consistent with the findings of (Belaynesh, 2010; Taye, 2008; Aklilu 2001and Dessalegn, 1998) which revealed that the students show a favorable attitude towards conservation of resources.

Last but not least, 20 items are used to examine students' and teachers' environment friendly participatory behavior. A score of 100 is the maximum score that indicates the most favorable willingness in environment friendly participatory behavior towards land degradation. On the other hand a score of 20 implies the most unfavorable willingness in environment friendly participatory behavior towards land degradation and similar environmental problems. In between extremes, a score of 60 notifies a neutral willingness in environment friendly participatory behavior towards land degradation.

Accordingly, when students' and teachers' environment friendly participatory behavior towards land degradation examined, as illustrated in table 2 students' mean score is (77.7) and teachers' mean score is (84.2). Similar to their attitude score, more than half of students (54.5%) and teachers (53.7%) scored above mean which is an indication of their readiness and willingness in participating with environment friendly activities that cures and prevents land degradation and related environmental problems. This study strengthened the finding of (Engidasew, 2010) which revealed that students are ready and willing to engage and participate in activities that promote environmental sustainability and protection of the environment for better living. When we compare students and teachers environmental participatory behavior, teachers have high readiness and willingness to participate in activities that cure and prevent land degradation and other environmental problems than students.

Table 2: Mean Scores of Students' and Teachers' Knowledge, Attitude and Behavior about Land Degradation

Level of education	№ of respondents	Variables	Mean	Above mean		Below mean		Standard deviation
				№	%	№	%	
Students	234	Knowledge	66.8	164	70	70	30	17.1
		Attitude	78.9	120	51.1	114	48.9	8.3
		Behavior	77.7	128	54.5	106	45.5	8.7
Teachers	52	Knowledge	75.9	30	57.6	22	42.4	7.7
		Attitude	87.4	29	55.7	23	44.3	4.9
		Behavior	84.2	28	53.7	24	46.3	5.3

4.2. Relationship of Environmental Knowledge, Attitude and Participatory behavior

To find out what types of relationship exist among the dependent variables of environmental knowledge, attitude and participatory behavior to each other, Pearson correlation coefficient is employed. As can be observed from table 3 study participants' environmental knowledge, attitude and participatory behavior are significantly correlated to each other. The relation relationship between attitude and participatory behavior(r=.617) as well as the relationship between knowledge and attitude (r=.447) are strong than the relationship between knowledge and participatory behavior(r=.417).

In general using the coefficient of correlation (r) it can be concluded that the relationship between these dependent variables is generally significant and moderate, but there is relatively better positive relation between attitude and participatory behavior (r=.617) followed by the relationship between knowledge and attitude (r=.447) and relationship between knowledge and participatory behavior (r=.417). This is inconsistent with the findings of (Engidasew, 2010; Teka, 2010) which concluded that there is weak relationship exist among environmental knowledge, attitude and practice and intension.

Table 3: Pearson Correlation of Environmental Knowledge, Attitude and Participatory Behavior across All Groups*.

Variables	Attitude	Behavior
Knowledge	.447**	.417**
Attitude		.617**

** Correlation is significant at the 0.01 level (2-tailed).

* Students, and teachers environmental knowledge, attitude and participatory behavior

4.3. Predictive power of Environmental knowledge on environmental Attitude and Participatory Behavior

As it can be seen from table 4, study participants environmental knowledge is a significant positive predictor of attitude (B=0.447, P<0.05) and participatory (B=0.417, P<.05). Thus, environmental knowledge accounted for 20% and 17.4% of the change in study participants attitude and participatory behavior respectively. When study participants environmental attitude is regressed on their attitude, the result revealed that attitude is a significant positive predictor of their environmental participatory behavior (B=.617, P<.05). Thus, study participants attitude accounted for 38.1% of the change in their environment friendly participatory behavior. This study coincides with the findings of Hsu and Roth (1998) which reports that environmental knowledge is powerful predictor of responsible environmental concern and behavior.

Table 4: Summary of Linear Regression on Environmental Knowledge Predictive Power over Environmental Attitude and Participatory Behavior across All Groups*.

Variables	Knowledge				Attitude			
	Beta(β)	R^2	T	Sig.	Beta(β)	R^2	t	Sig.
Attitude	.447	.200	8.419	.000				
Behavior	.417	.174	7.730	.000	.617	.381	13.225	.000

*students, and teachers environmental knowledge predictive power over attitude and behavior

5. Conclusion

The study indicated that significant proportion (70%) of students and (57.6%) of teachers participated in the study scored above the mean for issues addressed in environmental knowledge test about the cause, consequence, extent and possible solution of land degradation. On the other hand, more than half of students (51.1%) and teachers (55.7%) scored above mean in their environmental attitude score. Similarly, more than half of students (54.5%) and teachers (53.7%) scored above mean in their environment friendly participatory behavior towards land degradation.

Pearson correlation coefficient is employed and showed that the relationship between dependent variables is generally significant and moderate, but there is relatively better positive relation between attitude and participatory behavior (r=.617) followed by the relationship between knowledge and attitude (r=.447) and between knowledge and participatory behavior (r=.417). A linear regression analysis is employed to examine the study participants' environmental knowledge can predicts or not their environmental attitude and participatory behavior and the result showed that environmental knowledge is a significant positive predictor of attitude and participatory behavior which accounted for 20% and 17.4% of the change in attitude and participatory behavior respectively. The relationship and predictive power among dependent variables of environment friendly knowledge, attitude and participatory behavior towards land degradation is examined. Here, the relationship exist among these variables is significant and moderate and respondents environment friendly knowledge is a significant positive predictor of environment friendly attitude and participatory behavior towards land degradation cause, consequence and possible solution.

6. Recommendations

Based on findings and conclusions of the study, the following recommendations are forwarded for the concerned bodies:-

i.   The result of the study communicates that both students and teachers have fair level of environmental knowledge, attitude and participatory behavior towards land degradation. As a teacher it is expected that they possess higher level of environmental knowledge, attitude and participatory behavior than students which helps students in acquiring right knowledge, develop positive attitude and participatory behavior as teachers who are the main agents of educational process share for them in classroom instruction. Therefore, in order to increase the teachers environmental knowledge, attitude and participatory behavior which in turn increases their students environmental knowledge, attitude and participatory behavior, it is recommended that environmental experts in collaboration with NGOs who have concern for environmental protection and sustainability and other concerned bodies should provide training that equip

teachers with environmental knowledge, attitude and participatory behavior which have effect on the environmental knowledge, attitude and participatory behavior of students.

ii. The study also revealed that there is significant and moderate linear relationship between environmental knowledge, attitude and participatory behavior. The relationship between these dependent variables expected to show a strong relationship but in this study does not show this. Therefore, curriculum designers should take in to account the proportion to what extent theses dependent variables included in the curriculum.

iii. The study also communicates that environmental knowledge is a positive predictor of environmental attitude and participatory behavior. Therefore, it is recommended to expand the options for getting environmental knowledge through printed and electronic media across the country which in turn increases attitude and participatory behavior in the wider community that help in reducing and tackling environmental problems such as land degradation.

iv. Finally, the researcher wants to recommend those who are environment related experts and educators should conduct further research and investigation in environmental education strategies and techniques that help in equipping students and teachers as well as the wider community in good level of environmental knowledge, attitude and participatory behavior.

Acknowledgments

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