

## **Fostering Environmental Conservation Literacy with Focus on Edible Tree Planting activities among Basic Science Students in Ado Local Government Area of Ekiti State, Nigeria**

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### **Abstract**

*Environmental Conservation is the practice of preserving the natural world to prevent it from collapsing, due of human activities. It is the protection, preservation, management or restoration of natural environment and the ecological communities that inhabit them. The need to conserve the environment is crucial for ensuring a sustainable future. By preserving ecosystems, conserving biodiversity, and optimizing resource use, we can mitigate climate change, protect natural resources and promote the wellbeing of both present and future generations..Education is vital to enable a good practice of conservation. This study is an activity-based, experimental study, and involves all the Basic science students in Ado Local Government, Ekiti State. The sample is 100 basic science students selected through purposeful sampling technique. .The instrument for the study is a validated, self-constructed questionnaire to measure the environmental conservation literacy and attitude of Basic students, before and after the lessons. The study was a fourteen-week classroom and outdoor learning on 'Conservation of the Environment' .The treatment was activity-based, during which the students was given the opportunity to plant edible trees within their school environments. These activities was in steps; Getting to meet the students (1 week) classroom teaching about, and importance of conservation/ planning for seed planting (4 week) planting location selection/ clearing (2 weeks),seed selection (2weeks) procurement of seedlings and tools required (2 week) planting (2 weeks) watering and seedling monitoring (4 weeks). The students were excited to learn and participate in tree planting, develop positive attitudes towards protecting plant-life and exhibit practices that conserves their environments. The study recommends tree-planting activities in secondary schools to better manage their school environments.*

**Keywords:** environment, conservation, tree planting, basic students

### **Introduction**

Environmental Education, an aspect of Science Education is the study of one's surroundings which help individuals to have a better understanding of the environment and ways to manage it. The ability of the society to utilize, and as well protect or manage the environment is contingent to awareness and knowledge about the environment. Hence introduction of environmental education at all levels of education in a multidisciplinary way is necessary (Kimaryo, 2011).Environmental issues are the harmful effects of human

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activities on the environment. These include pollution, overpopulation, waste disposal, climate change, greenhouse warming climate change and others. Increase in human population and activities have necessitated high demands on the environment, causing deforestation, desertification and resulting in the degradation of the natural environment, thus threatening sustainability.

Various environmental protections have been practiced at individual, organizational and government levels with the aim of establishing a balance between man and the environment. Environmental conservation is the practice of protecting the natural environ by individuals. It is the planned or control exploitation or judicious use of natural resources. Solutions to environmental degradation have been mentioned to include; education, green innovation, planting of trees, sustainable agriculture among others (Munawa et. al., 2022). It's objectives are to protect natural resources in an existing environment and where possible, repair damages and reverse trends (Cunnigham & Christially, 2013). Human attitudes towards conserving the Environment is observably poor, as opined by Olu-Ajayi, (2018) this could be due to inadequate knowledge and understanding of the environment. There arises the need as never before, to imbibe through the school children to everybody, positive attitudes that will promote friendly environmental practices to ensure a sustainable environment for all. Formal education is a way by which the awareness could be made of the importance of, issues and behaviors towards conserving the Environment (Kales, et. al, 2023).

It was observed that integrating the concepts of environmental education into the school curriculum is vital in enhancing students' awareness of the importance of environmental management. The EU (2022) agreed and recommended the need to include environmental conservation, through the principle of green transition and sustainable development, into the teaching and learning practices. Tree planting can be identified as one of the ways of conserving the environment through green transition (Munawa, et.al., 2022). Steps involved in tree-planting include; choosing and preparing planting site, acquiring, good seedlings, preparing watering system, planting, caring for the trees and harvesting. Tree planting serves as a means to move trees, replace felled trees and repair the Environment. All trees provide benefits, with edible trees adding more values. Edible trees helps to break wind, serves as habitat, protects houses, shades from sunlight, aerate, yield economic benefit, serves as medicine and provide food and nourishment for the living as well as protection and shades for the non-living parts of the environment.

The teaching and learning of science can be a good means of protecting the Environment by engaging students in participatory activities of Environmental conservation. Secondary schools' Basic students are generally between the ages of 11-15. They easily learn when involved in activities-based instruction. This study involved students in edible-tree planting, to imbibe a behavior of conserving the environment into them and to the society at large. This is hoped to improve their interest in their environment, enhance positive environmental practices, reduce the impact of desertification and improve their interest in science learning through outdoor learning method.

Increasing high population coupled with human activities in a bid to make ends meet and live a comfortable life in the society has inflicted much demand on the available natural environment resulting to over-exploitation of natural environment. This has given rise to various Environmental issues among which is deforestation/desertification urgently demanding attention from everybody, refusal of which may result to sickness, poverty,

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hunger and natural disasters. Some measures have been taken by the Government to alleviate these issues, but it requires joint effort and practices by every member of the society to enable sustainability. Human attitudes towards the environment are observed as being poor (Erhabor & Don, 2016; Mutisya, et. al. 2015). There is the need to engage in day-to-day practices to repair and maintain the Environment, to be able to enjoy the derivatives from the environment. Thus the introduction of environmental education at all levels of education in a multidisciplinary way became necessary as opined by Kimaryo, (2011) in his study.

Knowledge is power and learning is by Practice. Inculcating the practice of tree planting among Basic secondary students, through activity based science learning is believed to be among the ways to achieve a forestation and curb desertification of the Environment. It is believed to help improve students' interest towards science learning and develop positive attitude to plant live in the Environment

### **Objectives of the Study**

The study seeks to foster Environmental Conservation literacy with focus on Edible tree planting activities among Basic Science students in Ekiti State Nigeria. It aims at developing positive attitudes towards Environmental Conservation in Basic students through edible tree planting activity. The study aims at doing this by:

- i. Teaching the topic " Conservation of the Environment" and
- ii. explaining the various forms of human activities and practices within the environment.
- iii. identifying the benefits derived from the environment by living things.
- iv. identifying some Environmental issues and its repercussions on living things.
- v. instituting various activities that can help in preserving the Environment
- vi. explaining 'Green life conservation' and effect on the Environment while encouraging planting of trees in replacement of felled ones.
- vii. preparing planting sites within school compound and engaging the students in edible tree planting within the school compound.

### **Literature Review**

The need to develop a positive attitude towards our environment for better living cannot be overemphasized. Environmental Conservation involves a process of cultivating responsible behavior patterns in protecting our Environment (Hollweg, et. al. 2011; Mutisya, et. al. 2015). Many studies to developing means of Environmental Conservation have been focused on the relationship between awareness (knowledge) feeling (attitude) and behavior (practice) of teachers and students in a formal education setting (Kales, et. al. 2023; Carmin, 2013; Liefänder & Bogner, 2018; Torka & Bogna, 2019; Wi & Chang, 2019) .

The EU (2022) adopted the recommendation to stimulate learning for green transition and sustainability, thus called for the need to incorporate the principle of green transition and sustainable development into the teaching and learning practices. Many countries now imbibe 'Learning for Sustainability' into their policies, strategies and curricular (EU, 2022). The role of knowledge in Environmental conservation cannot be over emphasized. Regardless of this, disparities in the knowledge of, attitude towards, and practices of environmental conservation have been noticed (Liefänder & Bogner, 2018; Boyes, 2012;

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Carmi, et al. 2015). Various age groups in China were sampled, and a research conducted to assess their Environmental knowledge and experience by Clayton et.al (2019) discovered that knowledge increases by age, while attitude decrease. A similar study by Negrev et. al. (2008) on school children in Israel reported a positive correlation of knowledge and attitude, and negative correlation of knowledge and practice. A high children engagement level was discovered in a study by Iwaniec & Curdt-Christiansen (2022) where they recommended the need of new curricular that considers Environmental sustainability and social change through solving children-based problems, in educating the coming generation. Considering the review, activity-based environmental education is hoped to be a means to conserving and sustaining the environment.

### **Methodology**

The study is experimental and activity-based. The population of the study comprises all the Basic Science students in Ado-Ekiti. The sample size is 100. A validated instrument was used to assess the initial, and after lesson knowledge of, and attitude of basic science students towards environmental conservation through tree planting. This was done by the researcher, with the help of research assistants in each school. The topic 'Environmental Conservation' was taught and students were engaged in Edible-tree planting activities involving; gardening, green spaces development, competition, conservation initiatives, tree planting drives, nature walks and observation. It was a hands-on experience in tree planting. The sample schools are the five (5) newly established public Secondary schools in Ado-Ekiti, located in Ekiti-Central Senatorial District of Ekiti State. The data collected were analyzed using inferential statistics.

### **Research questions**

The following question was raised to guide the study:

What are the benefits of tree planting to environmental conservation for sustainability?

### **Research hypotheses**

The following hypotheses are formulated and tested in the study:

1. Engaging science students in tree planting activities significantly improves the environmental conservation literacy.
2. Tree planting activities positively influence students' attitudes towards environmental conservation.

### **Results and Discussions**

**Research Question 1:** What are the benefits of tree planting to environmental conservation and sustainability?

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**Table 1: Benefits of tree planting to conservation sustainability**

S/N	The planting of edible tree in the environment will:	Agree	Neutral	Disagree	Mean
1.	Provide food	116 (77.3)	29 (19.3)	5 (3.3)	2.74
2.	Help reduce carbon dioxide	107 (71.3)	34 (22.7)	9 (6.0)	2.65
3.	Enhance biodiversity	99 (66.0)	31 (20.7)	20 (13.3)	2.53
4.	Promote sustainable living	99 (66.0)	35 (23.3)	16 (10.7)	2.55
5.	Reduce waste	106 (70.7)	19 (12.7)	25 (16.7)	2.54
6.	Beautify the environment	115 (76.7)	23 (15.3)	12 (8.0)	2.69
7.	Serve as food	106 (70.7)	27 (18.0)	17 (11.3)	2.59
8.	Boost economy	102 (68.0)	31 (20.7)	17 (11.3)	2.57
9.	Serve as wind-breaker	106 (70.7)	27 (18.0)	17 (11.3)	2.59
10.	serve as cooling shades	110 (73.3)	24 (16.0)	16 (10.7)	2.63
11.	Check erosion	101 (67.3)	23 (15.3)	26 (17.3)	2.50
12.	Use for medicinal purpose	107 (71.3)	24 (16.0)	19 (12.7)	2.59

**Percentages are enclosed in parentheses, Criterion mean = 2.00**

Table 1 presents the benefits of tree planting to conservation sustainability. Using a mean benchmark cut-off of 2.00 for the rating scale, all the items had mean scores above the cut-off point. This implies that provision of food, reduction of carbon dioxide, enhanced biodiversity, promotion of sustainable living, waste reduction, beautification of the environment, serve as food, boost economy, serve as wind-breaker, serve as cooling shades, check erosion and use for medicinal purpose are the benefits of tree planting to conservation sustainability.

**Hypothesis 1:** Engaging science students in tree planting activities significantly improves the environmental conservation literacy.

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**Table 2: ANCOVA of science students' environmental conservation literacy by treatment**

Source	SS	df	MS	F	Sig.	Partial Eta <sup>2</sup>
Corrected Model	1430.492	2	715.246	278.514	.000	.791
Intercept	98.176	1	98.176	38.229	.000	.206
Covariate (Pretest)	182.012	1	182.012	70.875	.000	.325
Group	100.633	1	100.633	39.186	.000	.210
Error	377.508	147	2.568			
Total	32912.000	150				
Corrected Total	1808.000	149				

\***p<0.05**

Table 2 shows that the computed F-value (39.186) obtained 1 and 147 degrees of freedom was significant at 0.05 level for the groups. The hypothesis is not rejected; implying that engaging science students in tree planting activities significantly improves the environmental conservation literacy. The treatment (engaging science students in tree planting activities) accounted for about 21% (Eta<sup>2</sup>=0.21) of the observed variance in environmental conservation literacy. The mean difference among the estimated marginal means of the groups, after correcting for the other effects in the model is presented in Table 5.

**Table 3: Mean scores by treatment**

Group	N	Mean	SD	Std. Error	Estimated Marginal Mean
Experimental	100	18.48	2.59	.204	16.36
Control	50	12.36	1.53	.339	13.42

Table 3 shows that students exposed to tree planting activities had higher estimated marginal mean of 18.48 than those not exposed to tree planting activities with an adjusted mean score of 12.36.

**Hypothesis 2:** Tree planting activities positively influence students' attitudes towards environmental conservation.



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**Table 4: ANCOVA of science students' attitudes towards environmental conservation by treatment**

Source	SS	df	MS	F	Sig.	Partial Eta <sup>2</sup>
Corrected Model	2850.930	2	1425.465	350.264	.000	.827
Intercept	488.834	1	488.834	120.116	.000	.450
Covariate (Pretest)	192.767	1	192.767	47.366	.000	.244
Group	493.004	1	493.004	121.141	.000	.452
Error	598.243	147	4.070			
Total	40832.000	150				
Corrected Total	3449.173	149				

\***p<0.05**

Table 4 shows that the computed F-value (121.141) obtained 1 and 147 degrees of freedom was significant at 0.05 level for the groups. The hypothesis is not rejected; implying that tree planting activities positively influence students' attitudes towards environmental conservation. The treatment (tree planting activities) accounted for about 45.2% ( $\text{Eta}^2=0.452$ ) of the observed variance in students' attitudes towards environmental conservation. The mean difference among the estimated marginal means of the groups, after correcting for the other effects in the model is presented in Table 5.

**Table 5: Mean scores on students' attitudes towards environmental conservation by treatment**

Group	N	Mean	SD	Std. Error	Estimated Marginal Mean
Experimental	100	21.74	3.24	.401	19.81
Control	50	12.81	1.67	.246	13.78

Table 5 shows that students who engage in tree planting had higher estimated marginal mean of 19.81 on attitudes towards environmental conservation than those who did not participate in tree planting activities with an adjusted mean score of 13.78.

## Conclusion

It was concluded from the study that the state of our environment is synonymous to our health. It is a general responsibility to preserve the environment. Positive attitude towards the environment is beneficial to the inhabitants thereof. Tree planting is a way of preserving the Environment and improving the wellbeing of people there-in.

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Activity – based, outdoor method of learning is a adequate, to disseminate the knowledge of the Environment and the ways of its preservation to students. Students' active participation in environmental conservation lessons and tree-planting will improve their knowledge; hence develop a positive attitude and practices of preserving the environment to ensure sustainability.

### Recommendations

Based on the findings and conclusion of this study, the following recommendations are made:

1. The act of caring and preserving the environment should be everybody's responsibility.
2. Environmental education should be incorporated into the minds of the young ones in the society.
3. The children and youths in the society should be brought up to respect and preserve the environment.
4. Basic teachers should be encouraged to make use of science teaching methods that best suits the topics to teach.
5. A 'recommended teaching method' should be specified in Basic science teachers' daily lesson plans in every topic.
6. Green spaces should be encouraged as part of learning environment, within the school compounds.
7. Everybody should be encouraged to plant trees to quench hunger, check erosion, break wind, all in the bid to conserve the environment

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### References

- Boyes, E.; Stanisstreet, M. (2012). Environmental education for behavior change: Which actions should be targeted? *Int. J. Sci. Educ.* 34, 1591–1614. [CrossRef]
- Carmi, N.; Arnon, S. & Orion, N. (2015). Transforming environmental knowledge into behavior: The mediating role of environmental emotions. *J. Environ. Educ.* , 46, 183–201.
- Carmi, N. (2013). Caring about tomorrow: Future orientation, environmental attitudes and behaviors. *Environ. Educ. Res.*, 19, 430–444. [CrossRef] .
- Clayton, S.; Bexell, S.; Xu, P.; Tang, Y.F.; Li, W.; Chen, L. (2019). Environmental literacy and nature experience in Chengdu, China. *Environ. Educ. Res.* 1–14. [CrossRef].
- Cunningham, M .& Christianly, C. (2013). Environmental Conservation and Preservation: Definition, Differences and Advocates. Retrieved from <https://study.com/academy/lesson/conservationists-vs-preservationists-definition-differences.html>



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- Erhabor, N. I. & Don. J. U. (2016). "Impact of Environmental Education on the Knowledge and Attitude of Students towards the Environment." *International Journal of Environmental and Science Education* 11, 12: 5367–5375. doi:10.25073/0866-773X/68.
- EU. (2022). European Council Recommendation on Learning for Environmental Sustainability. Trondheim, Norway.
- Hollweg, K.S.; Taylor, J.R.; Bybee, R.W.; Marcinkowski, T.J.; McBeth, W.C. & Zoido, P. (2011). Developing a Framework for Assessing Environmental Literacy; NAAEE: Washington, DC, USA. Available online: <http://www.naaee.net/sites/default/files/framework/DevFrameworkAssessEnvLitOnlineEd.pdf>.
- Iwaniec, J & Curdt-Christiansen, X. (2020) , 'Parents as Agents: Engaging Children in Environmental Literacy in China', *Sustainability*, vol. 12, no. 16, 6605. <https://doi.org/10.3390/su12166605>
- Kales, H., Yayla, O., Tarinc, A., & Keles, A. (2023). The effect of environmental management practices and knowledge in strengthening responsible behavior: The moderator role of environmental commitment. *Sustainability*, 15(2) 1398 <https://doi.org/10.3390/su15021398>.
- Kimaryo, L. (2011). Integrating environmental education in primary school education in Tanzania: Teachers' perception and teaching practices. Stockholm: ABO Akademi University Press.
- Liefländer, A. K. & Bogner, F. X. (2018). Educational impact on the relationship of environmental knowledge and attitudes. *Environ. Educ. Res.* 24, 611–624. [CrossRef]
- Munawar, S., Yousaf, H., Ahmed, M. & Rahman, S. (2022). Effects of Green human resources management on green innovation through green human capital, environmental knowledge and managerial environmental concern *J. Hosp. Tour. Manag.* 52,141-150 [CrossRef] .
- Mutisya, S. M., Kipgetich, K. E. & Rono, K. J. (2015). "Positive Attitude towards Environmental Conservation: The Role of Primary Education in Kenya." *Asian Journal of Management Sciences & Education* 2, 4: 203–215.
- Negev, M.; Gonen, S.; Garb, Y.; Salzberg, A.; Tal, A. (2008). Evaluating the environmental literacy of Israeli elementary and high school students. *J. Environ. Educ.* 39, 3–20. [CrossRef]
- Olu-Ajayi, F.E. (2018). The Effect of Mentoring on Secondary Schools Science Students' Attitude towards Environmental Practices in Urban Location. *PEOPLE: International Journal of Social Sciences*.3,4: 1730-1740.
- Torkar, G. & Bogner, F. (2019). Environmental values and environmental concern. *Environ. Educ. Res.* 25, 1570–1581. [CrossRef] .
- Wi, A. & Chang, C.(2019). Promoting pro-environmental behaviour in a community in Singapore—From raising awareness to behavioural change. *Environ. Educ. Res.* 25, 1019–1037. [CrossRef].