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ENVIRONMENTAL KNOWLEDGE OF AGRICULTURAL SCIENCE STUDENTS IN SOUTH-WESTERN NIGERIA.

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ABSTRACT
The study investigated the environmental knowledge of agricultural science students in South –Western Nigeria. It also investigated gender differences in the environmental knowledge of the subjects. Using an ex-post facto research design, 267 randomly selected Agricultural Science students from Oyo, Ogun and Osun States were involved in the study. One instrument: Questionnaire on Environmental knowledge of Agricultural Science Studies QEKAS(KR 21=0.83) was used. Two research questions and hypotheses were addressed and tested at 0.05 level of significance. The data collected were analyzed using percentages, frequencies, mean scores, chi- square and t-test. The findings revealed a poor knowledge of some environmental concepts such as Soil/Forest Conservation, Pollution and Environmental factors affecting Agricultural production. It further showed non- significant gender differences in their knowledge of environment concepts. A number of recommendations were advanced to ensure better performance on the factors measured.

KEYWORDS: Environmental Knowledge, Environmental Education, Agricultural science, Students, South-Western Nigeria.

INTRODUCTION

Over sixteen years ago (1990), the United Nations Educational, Scientific and Cultural Organization (UNESCO), and United Nations Environment Programme (UNEP) declared the 1990s as the decade for Environmental Education (EE)and Training (Aina, 1990). This is sequel to the UNEP's report showing the alarming and rapid general degradation of the environment throughout the world.

The situation is aptly described by Ajao (1993) who maintained that the Nigerian environment is ill and beset with several problems. Noibi and Lawal (1993) identified some of the problems such as flooding, soil erosion, gully erosion, coastal and marine erosion, desertification and deforestation.

To solve these problems, a number of recommendations were made. Ajao (1993) recommended the "institution of instruments and educational programmes". This essentially refers to Environmental Education (EE) which Olagunju (1998) succinctly defined as " a process of acquiring or imparting knowledge, skills and attitude about, from and for the environment, for the sustainable use of natural and man- made resources".

In response to global concern and the recommendations from UNESCO- UNEP (1989) on the need for environmental literacy (which essentially incorporates environmental knowledge, attitudes and skills), Nigeria began a programme of environmental education, both in the formal and informal education sectors. This started with the adoption of a National Conservation Education Strategy (NCES) in 1990 by the National Council of Education (NCE) even though there had been a more or less formal commitment in the 1977 National Policy on Education to providing an education that would enable people to apply scientific knowledge to the solution of environmental problems and subsequently to the improvement of the environment for the use and convenience of the society. (Adara, 1993). The Nigerian Educational Research and Development Council (NERDC) was thereafter directed to integrate EE components into the broad

spectrum of existing school subjects, starting with the secondary school. Consequently various EE components were infused into the curricula of different subjects. Years after, the effects of the infusion amongst Agricultural Science students have not been examined. Results of findings in other subjects such as integrated science showed poor knowledge of environmental education concepts in the curriculum (Akintayo , 2001). Also an analysis of WAEC Agricultural Science result for ten years (1992-2002) shown in table 1 revealed that just about 30% of the students obtained credit passes (A1- C6) in the subject annually. The general poor knowledge of the subject will most likely affect their knowledge of environmental concepts in the curriculum.

Against this background and after various other efforts, an assessment of the level of knowledge of secondary school students is necessary to determine whether or not progress has been made in respect of stated objectives of EE in Nigeria.

Statement of the Problem

The study investigated environmental knowledge of Agricultural Science students in selected senior secondary schools in Oyo, Ogun and Osun State of South- Western Nigeria. It also investigated gender difference in their environmental knowledge.

Research Questions

The study addressed the following questions:

(1) Do Agricultural Science Students have adequate knowledge of environmental concepts in Agricultural Science curriculum?

(2) Are there differences due to gender between Agricultural Science students in their knowledge of environmental concepts in agricultural science curriculum?

Table 1: Students performance in May/June WASSCE (1992-2002) in Agricultural Science

Year	Entry	Total (A1C6)	Total (P7-P8)	Total F9	A1-C6 In %	P7-P8	F9 in %
1992	273040	81122	88665	103253	29.7	32.5	37.8
1993	378607	145852	78960	153795	38.5	20.9	40.6
1994	495279	130893	84696	179689	33.1	21.4	45.5
1995	361974	149233	102113	110627	41.3	28.4	69.6
1996	401676	92041	81273	228362	22.9	20.2	56.9
1997	490108	74567	122947	292594	15.2	25.1	59.7
1998	503901	117729	134181	237901	23.37	26.64	47.23
1999	599101	188492	151001	242143	31.46	25.20	40.42
2000	488617	94300	130592	263726	19.30	26.53	53.97
2001	792986	289031	214658	289297	36.45	27.07	36.48
2002	708298	236641	216072	255585	33.40	30.50	36.08

SOURCE: WAEC annual reports (1992-2002), WAEC office, Lagos.

Research Hypotheses

The following hypotheses were formulated to guide the study:

H01: Agricultural Science students do not have significant knowledge of environmental concepts in agricultural science curriculum.

HO2: There is no significant gender difference, amongst agricultural science students in their of knowledge of environmental concepts in Agricultural Science curriculum.

Table 2: Frequency and Percentage Distribution of subjects' scores on Test of Environmental Knowledge of Agricultural Science.

Item No	Wrong Responses		Correct Responses	
	No	%	No	%
1	105	39.3	162	60.7
2	72	27.0	195	73.0
3	183	68.5	84	31.5
4	267	100	0	0.0
5	186	69.7	81	30.3
6	138	51.7	129	48.3
7	174	65.2	93	34.8
8	165	61.8	102	38.2
9	225	84.3	42	15.7
10	177	66.3	90	33.7
11	150	56.2	117	43.8
12	192	71.9	75	28.1
13	102	38.7	165	61.8
14	267	100	0	0
15	69	25.8	198	74.2

METHODOLOGY

Research Design

The study adopted an ex-post facto design because the factors under investigation already existed.

Population and Sample

The population for the study consisted of all Agricultural Science students in senior secondary schools in the six states of South-Western Nigeria. 267 (135 males and 132 females) SS2 Agricultural Science students, from six co- educational secondary schools in Oyo, Ogun and Osun State, (2 schools randomly selected from each state) were used in the research work which took place in May, 2007.

Research Instrument

The instrument used is:

Questionnaire on Environmental Knowledge of Agricultural Science Students (QEKAS).QEKAS consisted of two sections. Section A was used to obtain socio- demographic data of the subjects while section B consisted of a 15-item multiple choice test designed to measure students' knowledge of selected environmental concepts and issues in Agricultural Science curriculum. Such concepts include Land and Soil conservation, Pollution, forest conservation, environmental factors affecting agricultural production, environmental effects of using chemicals such as herbicides, pesticides, fungicides etc.

Table 3: Analysis of the mean scores and the standard deviation of Students' Knowledge of Environmental Concepts in Agricultural Science Curriculum based on Gender.

	Gender	N	X	SD
Male	135	14.4	4.79	
Female	132	14.3	5.05	

Validity and Reliability of the Instrument

Section B of QEKAS consisted of WAEC past questions on environmental concepts covered in topics already treated by the students. Initially, 30 items were prepared and submitted to four experts on test construction in Science Education for face, content and context validation. The items were then modified after scrutiny. The level of difficulty and discrimination indices were computed and items within 0.5-0.60

were retained A Kuder Richardson (KR-21) test was computed to determine the internal consistency of the instrument and a value of 0.83 was obtained.

Table 4: Chi Square Analysis of Test of Environmental Knowledge of Agricultural Science Students

Item No	Wrong Responses		Correct Responses		SD	X2	Df	P	Remark
	No	%	No	%					
1	105	39.3	162	60.7	0.49	12.1	1	0.00	S
2	72	27.0	195	73.0	0.44	56.7	1	0.000	S
3	183	68.5	84	315	0.47	36.7	1	0.000	S
4	267	100	0	0.0	0.0	-	-	-	-
5	186	69.7	81	30.3	0.46	41.3	1	0.000	S
6	138	51.7	129	48.3	0.50	0.30	1	0.582	NS
7	174	65.2	93	34.8	0.48	24.6	1	0.000	S
8	165	61.8	102	38.2	0.49	14.9	1	0.000	S
9	225	84.3	42	15.7	0.36	125.4	1	0.000	S
10	177	66.3	90	33.7	0.47	28.3	1	0.000	S
11	150	56.2	117	43.8	0.49	4.1	1	0.000	S
12	192	71.9	75	28.1	0.45	51.3	1	0.000	S
13	102	38.7	165	61.8	0.49	14.9	1	0.000	S
14	267	100	0	0	0.00	-	-	-	-
15	69	25.8	198	74.2	0.44	62.3	1	0.000	S

S Significant NS- Not Significant P <0.05

Data Analysis

The data obtained were analyzed using percentages, frequency counts, t-test and chi-square . 135 (or 50.6%) male and 132 (or 49.5%) female students were used for the study.

RESULTS

Research Question 1: Do Agricultural Science students have adequate knowledge of environmental concepts in Agricultural Science curriculum?

Table 2 reveals the scores of the respondents on the test of environmental knowledge in agricultural science curriculum. Out of the fifteen (15) items, majority of the students picked correct options in 3 items (items 1, 2, and 13), while majority of them chose wrong answers in the other twelve (12) items. This indicates a poor knowledge of environmental concepts in Agricultural Science curriculum.

Table 3: shows a slightly higher mean scores for male students than females.

Research Hypothesis 1

H01: Agricultural science students do not have significant knowledge of environmental concepts in agricultural science curriculum.

Table 5: T- test Analysis of Students' Knowledge of Environmental Concepts in Agricultural Science Curriculum based on Gender.

Gender	N	X	SD	t	Df	P	2-Tail	Remark
Male	135	14.4	4.79	.136	265	.895	0.05	NS
Female	132	14.3	5.05					

NS= Not Significant (t-cal . 136 <t- critical 1.96).

Table 4 reveals significant majority correct responses in Items 1, 2 and 13 only while significant majority wrong responses were in all the other Items except Item 6 indicating poor environmental knowledge.

Research Hypothesis
H02: There is no significant gender difference, amongst agricultural science students in their knowledge of environmental concepts in agricultural science curriculum.

Since t calculated (0.136) is less than t critical (1.96), therefore there is no significant difference between the males and females in their environmental knowledge. H02 is therefore accepted.

DISCUSSION
i. Adequacy of Students' Knowledge of Environmental Concepts
Findings in respect of Research Question 1 and Research Hypothesis 1 revealed poor knowledge of environmental and non-significant environmental knowledge amongst senior secondary school Agricultural science students. This points to the fact that much has not been achieved in transmitting the knowledge of environmental concepts to Agricultural science students in pollution soil and forest conservation, environmental factors affecting agricultural production etc. This supports the findings of Mansaray and Ajiboye (1997) that Nigerian students have poor knowledge of environmental concepts in the curricula. It also supports the finding of Akintayo (2001) in respect of Integrated Science.

ii. Students' Environmental Knowledge by Gender
Findings from Research Question 2 show slightly higher mean scores for male than female subjects (male- $X = 14.4$, female $X = 14.3$). It shows that agricultural science curriculum is suitable for both sexes. A non- significant gender difference was however found in respect of Research Hypothesis 2. This finding is in line with that of Olagunju (1998) which revealed a non-significant gender difference in students' cognitive achievement in biology using an environmental education curriculum package. This could be because of better exposure of males to environmental problems and issues.

RECOMMENDATIONS
Based on the findings from this study, the following recommendations are advanced:
1. Efforts should be made to develop new and better instructional approaches for the teaching and learning of environmental concepts in the agricultural science curriculum.

2. Prevailing and specific environmental problems and issues in Nigeria should be identified, their implications emphasized and solutions proffered. All of these should thereafter be incorporated into the curricula of all subjects not only Agricultural Science. Such environmental issues and problems and suggested solutions are:

i. Use of green manuring and mulching instead of bush burning.
ii. Encouragement of practices such as afforestation, regeneration and selective exploration instead of deforestation
iii. Pruning of tree branches instead of clean clearing.
iv. Use of manure (farm yard manure, Green manure and compost) instead of excessive use of chemical fertilizers
v. Use of crop rotation to control soil pests and diseases such as Root Knot nematode diseases to Tomato and Potato instead of using chemicals such as pesticides, nematicides, insecticides etc
vi. Planting of leguminous crops such as Cowpeas, Groundnut, and Melon etc instead of Nitrogenous fertilizers.

3. The study should be replicated to cover all the six geographical zones in Nigeria to give a clearer picture of the current situation in Nigeria.

CONCLUSION

It is important to state that the extent to which the findings in this study can be generalized to all the states in Nigeria has not been ascertained. Further studies need to be carried out to cover other states in the country. However, Ignorance is a serious disease to national development. Environmental awareness is therefore a strong step towards eradicating this disease and promoting sustainable development through agriculture.

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