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Causes, Effects and Remedies to Agro-Ecological Degradation of Secondary School Environment in Bayelsa State

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Abstract: *The study critically examined the causes, effects and remedies of agro-ecological degradation on secondary school environment in Bayelsa State, Nigeria. Descriptive survey design was used in the research. Four (4) specific objectives and four research questions guided the study white four (4) null hypotheses were tested at 0.05 alpha. Sample for the study comprised 190 respondents, made up of 95 principals and 95 teachers of agriculture. A 60-item survey was design on a 4-point scale to gather data. Weighted mean scores were utilised to analyse the data, and the t-test statistical test was used to test the null hypothesis at the 0.05 alpha. The study found 15 agro-ecological problems, 15 causes, 15 effects and 15 remedial measures to the agro-ecological problems affecting school environment. There was no substantial disparity in the mean ratings of the responses of principals and teachers of agriculture, on the remedial measures of the agro-ecological problems affecting school environment. In light of the results, the study suggests, that school perimeter fences should be reinforced with live growing shrubs while adopting multi-disciplinary approaches in mitigating environmental degradation.*

Keywords: Agro-ecological, Degradation, Secondary School, Environment.

Introduction

Ecology is the study of the relationship between the living world, including humans, and their environment. Environmental biology is an academic discipline that investigates the interplay between living organisms and their surroundings (Knight, 2015). In reality, every aspect of ecology entails an organism and its environment existing in a reciprocal relationship. For example, palm trees in their natural forest environment interact with specific biotic and abiotic factors. Soil water, wind, minerals, atmospheric carbon dioxide, sunlight, and temperature are examples of such abiotic factors. Insects, birds, rodents, bacteria, fungi, nematodes, and parasites, among others, are included in the biotic factors. Hence, agro-ecology denotes the correlation that exists between biotic and abiotic factors, including the cultivator and his surroundings. Habitat biology is the common name for ecology, which is typically highly concerned with the habitat (Osinem, 2005).

Within an environment, numerous relationships exist between organisms. The dietary chain is one of the most basic. Herbivorous consumers and animals within the habitat will consume the vegetation; subsequently, carnivorous consumers will consume the vegetation. Thus, a chain connects the individuals' lives. At each level, this correlation influences the number of organisms. In comparison to herbivores, a greater quantity of plants will be present, and these will subsequently surpass the number of carnivores. This arrangement is known as the "Pyramid of Numbers." Different food chains are linked to form food webs as when more than one herbivore feed on the same plant and in turn, different carnivores feed on them.

The transfer of energy and substances among organisms occurs via food webs. Additional interspecies relationships include parasitism, in which one organism survives and is dependent on another, and symbiosis, in which two organisms coexist in close proximity for mutual benefit. Additionally, organisms develop intimate connections through their interactions with the physical environment. Photosynthesis, for example, releases oxygen into the atmosphere from plants that animals use for respiration. Plants can utilise carbon dioxide (CO_2) produced during respiration in order to facilitate photosynthesis. The habitat's collection of these interdependencies constitutes an ecosystem. The environment's physical components comprise the ecosystem as a whole. The ecosystem is a dynamic entity that consists of physical, chemical, and biological processes operating within a specific space-time unit. An ecological system is a functional assemblage of organisms and their environment that engage in reciprocal interactions (Kimmins, 2017).An ecosystem can be defined as a unified entity comprising all organisms within a specific geographical region that engage in interactions with the physical environment in such a way that establishes a distinct trophic structure, biotic adversity, material cycles, and energy flow. Furthermore, an ecosystem can be defined as a collection of plant, animal, and microbial species that inhabit a specific location and function as a self-regulating and self-maintaining system through their interactions with one another and their physical and chemical surroundings (Slingclay, 2016).

The ecosystem has the following four components. (1) abiotic (2) biotic (3) autotrophic (4) heterotrophic. The abiotic components constitute the non-living factors of the environment responsible for providing the atmosphere, climate and soil or geological requirements to both plants and animals. This comprises temperature, water, atmosphere, energy, light and soil.

Biotic communities are plants and animals in terrestrial and aquatic habitats. Both producers and consumers are present. Producers produce food for the consumers. Man associates with plants and animals and environment for the purpose of obtaining food and habitation. Man is directly dependent on plants and animals for organic and inorganic substances and indirectly on micro-organisms, which contribute greatly to making the nutrients available to plants as an omnivore. Man obtains water directly from plants and animals when he uses them as food. The biotic community is categorized into three components, viz: autotrophic elements, heterotrophic elements and decomposers. The autotrophic elements are the producers chiefly the green plants. They are responsible for fixing the energy of the sun to manufacture food from simple inorganic substances. Autotrophic metabolism is extreme in the upper stratum in the ecosystem where most of the light is available (Osinem in Egbule, 2018).

The major consumers are the heterotrophic components, which ingest verdant plants and other organisms. They reorganise the food that the autotrophs have stored before decomposing the complex substances back into simple, inorganic compounds. Decomposers, which are predominantly bacteria and fungi, decompose complex compounds and organic matter. While utilising a portion of the material, they also return some of the simpler substances to the ecosystem.

An investigation of the study area revealed that the agro ecology, which hitherto had been mutualistic, is now exhibiting antagonistic relationship. Consequently, the school farms are neither fertile nor productive hence cannot be used as an instructional material for the effective teaching and learning of practical agriculture in schools. That is, there is adverse agro-ecological degradation culminating into problematic soils in the study area, which cannot be used as an instructional media to enhance effective teaching and learning of agricultural science. Consequently, there is students' poor academic achievement with its associated crime and criminality in the society. Therefore, it becomes necessary to identify the causes of agro-ecological degradation of secondary school environment with a view to proffer remediation hence this study. Specifically, the study sought to:

1. identify the types of agro-ecological problems that degrade school environment;
2. identify the causes of agro-ecological problems;
3. ascertain the effects of agro-ecological problems on school environment; and
4. determine remedial measures to agro-ecological problems affecting school environment.

Research Questions

The following research questions were raised to guide the study.

1. What are the types of agro-ecological problems that degrade secondary school environment in Bayelsa State?
2. What are the causes of agro-ecological problems?
3. What are the effects of agro-ecological problems on the school environment?
4. What are the remedial measures to agro-ecological problems affecting school environment?

Hypotheses

The study tested the following hypotheses at 0.05 alpha:

Ho_1: There is an insignificant disparity in the mean ratings of principals and teachers of agriculture on the types of agro-ecological problems that degrade school environment.

Ho_2: There is an insignificant disparity in the mean ratings of principals and teachers of agriculture on the causes of agro-ecological problems.

Ho_3: There is an insignificant disparity in the mean ratings of principals and teachers of agriculture on the effects of agro-ecological problems on school environment.

Ho_4: There is an insignificant disparity in the mean ratings of principals and teachers of agriculture on the measures for mitigating agro-ecological problems affecting school environment.

Methodology

The research was carried out in Bayelsa State, Nigeria. The study used a descriptive survey approach. The study was guided by four specific goals. The research included all principals and agricultural science instructors who were teaching Senior Secondary School (SSS III) courses.

The target population comprised 380 respondents, which are made up of 190 principals and 190 teachers of agriculture teaching SSS III classes that are spread across the 190 public secondary schools in the study area. The purposive sampling technique was used to select a sample size of 380 respondents for the study.

The data collection instrument used was a 60-item questionnaire, designed with a structured format consisting of four answer choices. The instrument validated by three experts, one in Agricultural Education of the Department of Vocational and

Technology Education, one in Measurement and Evaluation in Educational Foundations while the last one in Geography/Environmental Education in same Educational Foundations, all in the Niger Delta University, Bayelsa State, Nigeria.

To assess dependability, the Cronbach Alpha technique was used, resulting in a reliability value of 0.82, indicating that the instrument was dependable for the research. Because the instrument was not scored in a way that allowed for only two possible responses, and the reliability coefficient was above the acceptable threshold as determined by Kline (1999), it was deemed reliable and used for the research.

To ensure quality data collection, seven (7) trained research assistants joined the researcher, totaling eight (8) enumerators to obtain data from the respondents in each of the eight L.G.As; viz: Brass, Ogbia, Nembe, Ekeremor, Sagbama, Kolokuma/Opokuma, Southern Ijaw and Yenagoa. Out of the 190 questionnaires sent to the participants, 150 were completed and returned. These 150 questionnaires were included for the analysis, which represents a return rate of 79%.

The acquired data were analysed using the weighted mean, and the t-test statistics were used to test the null hypotheses at a significance level of 0.05. The result was interpreted as either agree or disagree based on a cut-off value of 2.50 on the 4-point rating scale. Therefore, any agro-ecological item with an average value between 2.50 and 2.49 was classified as agreeing, whereas any item with a value between 0.5 and 2.49 was classified as disagreeing. Furthermore, any item with a standard deviation between 0.00 and ±1.96 indicated that the respondents' opinions were closely aligned with the mean and each other. In such cases, the item was considered legitimate. During the hypothesis testing, the research confirmed the hypothesis that there is insignificant variation for any item if its estimated t-value is lower than the t-table value at a significance level of 0.05 and with 148 degrees of freedom.

Results

The findings were derived from the investigation of the study topics and the testing of hypotheses.

Research Question 1:

What are the types of agro-ecological problems that degrade secondary school environment?

Ho_1: There is an insignificant disparity in the mean ratings of principals and teachers of agriculture on the types of agro-ecological problems that degrade school environment.

Table 1: Mean Ratings and T-Test Analysis of the Mean Responses of Principals and Teachers of Agriculture on the Types of Agro-Ecological Problems that Degrade School Environment ($n_1 + n_2 - 2$)

Item No.	Agro-Ecological Problems	Principal ($n_1 = 95$) $\overline{X_1}$	SD_1	Agric. teacher ($n_2 = 95$) $\overline{X_2}$	SD_2	t-cal	Remarks
1.	Declining soil fertility.	3.63	0.71	3.52	0.69	0.57	NS
2.	Laterization and oceanification.	2.62	1.19	2.68	1.33	0.29	NS
3.	Over-grazed pastures.	3,08	0.87	3.11	0.93	0.18	NS
4.	Chemical destruction of soil life.	3.89	0.37	3.82	0.65	0.11	NS
5.	Soil erosion.	3.60	1.08	3.29	0.82	1.91	NS
6.	Drought.	2.78	1.12	2.92	1.11	0.73	NS
7.	Destruction of natural vegetation by bush fire.	3.32	0.73	3.20	0.95	0.81	NS
8.	Fast disappearance of wildlife and forest vegetation.	3.08	0.87	3.11	0.93	0.18	NS
9.	Paucity of firewood and water.	3.10	0.94	3.38	0.69	1.68	NS
10.	Students versus herders' conflict.	3.63	0.71	3.52	0.69	0.57	NS
11.	Parasitic weeds infestation	3.08	0.87	3.11	0.93	0.18	NS
12.	Pollution of water, air, soil and food with chemicals.	3.10	0.87	3.40	0.69	1.66	NS

13.	Ozone layer depletion.	2.98	0.93	2.99	0.85	0.11	NS
14.	Flood menace	3.08	0.87	3.11	0.93	0.18	NS
15.	Green House effects	2.98	1.09	2.08	1.08	0.52	NS

Key t-tab = ($\pm$1.96); DF = 148

The data in Table 1 showed that all fifteen (15) assertions had mean ($\bar{X}$) values ranging from 2.62 to 3.89, all of which were above the cut-off mark of 2.50. Consequently, they are seen to be in agreement. This indicates that all the participants agree that the fifteen (15) assertions represent agro-ecological issues that cause degradation in the secondary school environment in Bayelsa State. The range of standard deviation values was between 0.37 and 1.19, all of which are below 1.96. This indicates that the respondents' replies were closely aligned with each other, suggesting that the claims were genuine.

Table 1 demonstrates that all 15 assertions had estimated t-values of 0.11 and 1.91, which were lower than the t-tab ±1.96, df = 148, at 0.05 alpha. This suggests that there was no significant disparity in the average evaluations given by agriculture administrators and teachers about the many agro-ecological issues that negatively impact the school environment. Therefore, the proposed null hypothesis, which states that there is an insignificant distinction, was confirmed for all 15 items.

Research Question 2

What are the causes of agro-ecological problems?

Ho_2: There is an insignificant disparity in the mean ratings of principals and teachers of agriculture on the causes of agro-ecological problems.

Table 2: Mean Ratings and T-Test Analysis of the Mean Responses of Principals and Teachers of Agriculture on the Causes of Agro-Ecological Problems ($n_1 + n_2 - 2$)

Item No.	Causes of Agro-ecological problems	Principal ($n_1 = 95$) $\overline{X_1}$	SD_1	Agric. teacher ($n_2 = 95$) $\overline{X_2}$	SD_2	t-cal	Remarks
1.	Decline in soil fertility is caused by leaching.	3.79	0.42	3.78	0.59	0.32	NS
2.	Volatilization and reduction of organic materials causes soil nutrients improvement.	2.73	1.12	2.92	1.11	0.75	NS
3.	Laterization is caused by wind erosion.	3.68	4.47	3.68	0.47	0.07	NS
4.	Deforestation is caused by bush burning.	3.79	0.42	3.78	0.59	0.32	NS
5.	Destruction of soil life through the use of chemicals.	3.23	0.98	3.13	0.43	0.62	NS
6.	Tractorization is caused by mechanization.	3.38	0.49	3.29	0.71	0.90	NS
7.	Oceanification is caused by deforestation and wave.	3.08	0.87	3.19	0.62	0.09	NS
8.	Over-grazing is caused by decreased rangeland area.	3.36	0.44	3.78	0.76	1.38	NS
9.	Flared gas near farm attracts pests.	3.79	0.42	3.78	0.59	0.32	NS
10.	Destruction of soil life through the use of chemicals.	3.60	0.81	3.53	0.89	0.47	NS
11.	Bush burning causes nutrient loss.	3.08	0.87	3.11	0.93	0.18	NS

12.	Soil erosion is caused by rainfall.	3.23	0.98	3.12	0.95	0.95	NS
13.	Soil erosion is caused by deforestation.	3.68	4.47	3.68	0.47	0.07	NS
14.	Drought is caused by long period of intensive sunshine.	3.79	0.42	3.78	0.59	0.32	NS
15.	Bush fire is caused by farmers, nomadic herders, hunters, bee hunters and petroleum pipe leakages.	3.38	0.49	3.29	0.71	0.90	NS
16.	Gas flaring depletes the ozone layer.	3.68	4.47	3.69	0.47	0.07	NS
17.	Extinction of wildlife and forest vegetation is caused by deforestation.	3.08	0.49	3.29	0.71	0.90	NS
18.	Paucity of firewood is caused by deforestation and bush burning.	3.38	0.49	3.29	0.71	0.90	NS
19.	Students versus herders' clashes are caused by destruction of school farm by cattle.	3.08	0.87	3.11	0.93	0.18	NS
20.	Parasitic weeds infestation is caused by presence of weeds and their seeds in school farms.	3.23	0.98	3.12	0.95	0.95	NS
21.	The three major causes of pollution include: technological, economic and social.	3.68	4.47	3.68	0.47	0.07	NS
22.	Global warming is caused by climate change.	3.79	0.42	3.78	0.59	0.32	NS
23.	Flooding is caused by release of large volume of water by dams.	3.38	0.49	3.29	0.71	0.90	NS
24.	Green House Effect is caused by destruction of Ozone layer.	3.68	4.47	3.69	0.47	0.07	NS

Key t-tab = ($\pm$1.96); DF = 148

The data reported in Table 2 indicated that the mean ($\bar{X}$) values for all twenty-four (24) statements ranged from 2.73 to 3.79, all of which exceeded the benchmark of 2.50. Therefore, they are seen to be in agreement. All respondents agreed that the twenty-four (24) assertions were the real sources of agro-ecological difficulties in the school environment. The range of standard deviation values, which varied from 0.42 to 1.12, was below the threshold of 1.96. This suggests that the respondents' replies were closely aligned with each other, demonstrating the validity of the items.

Table 2 demonstrates that all twenty-four claims had estimated t-values ranging from 0.06 to 0.95. These values were lower than the t-tab ±1.96, df. = 148, at 0.05 alpha. This suggests that there was no significant disparity in the average assessments of the replies provided by administrators and agriculture instructors about the factors contributing to agro-ecological issues. Therefore, the proposed null hypothesis, which suggests that there is no significant distinction, was upheld for all 24 items.

Research Question 3

What are the effects of agro-ecological problems on school environment?

$H0_3$: There is an insignificant disparity in the mean ratings of principals and teachers of agriculture on the effects of agro-ecological problems on school environment.

Table 3: Mean Ratings and T-Test Analysis of the Mean Responses of Principals and Teachers of Agriculture on the Effects of Agro-Ecological Problems on School Environment ($n_1 + n_2 - 2$)

Item No.	Effects of Agro-ecological problem on school environment	Principal ($n_1 = 95$) $\overline{X_1}$	SD_1	Agric Teacher ($n_2 = 95$) $\overline{X_2}$	SD_2	t-cal	Remarks
1.	Poor school farm productivity.	3.38	0.49	3.29	0.71	0.90	NS
2.	Laterization reduces the productive potentials of land.	3.23	0.98	3.12	0.95	0.95	NS
3	Oceanification reduces arable land.	3.08	0.87	3.11	0.93	0.18	NS
4.	Over grazing leads to soil erosion and poor regeneration of pasture.	3.08	0.76	3.19	0.62	0.09	NS
5.	Chemicals inactivate or kill soil organisms.	3.60	0.81	3.53	0.89	0.47	NS
6.	Chemicals reduces the power of Rhizobium and *Nitrobacter* bacteria leading to soil infertility and unproductivity.	3.18	0.87	3.40	0.69	1.68	NS
7.	Soil erosion leads to loss of soil and plant nutrients.	2.98	1.09	2.08	1.08	0.52	NS
8.	Gully erosion causes loss of school environment.	2.52	1.24	2.39	1.29	0.34	NS
9.	Drought leads to poor availability.	3.32	0.73	3.20	0.95	0.81	NS
10.	Bush fire reduces soil fertility leading to poor harvest.	3.10	0.94	3.38	0.69	1.68	NS
11.	Wildlife and vegetation disappearance leads to species extinction.	2.63	1.20	2.69	1.33	0.30	NS
12.	Shortage of firewood and water leads to wastage of time and energy in search of water and firewood, high cost of firewood and water, lack of water for agricultural use.	3.63	0.71	3.59	0.69	0.57	NS
13.	Students versus herders' clashes threatens the nation's unity and peaceful co-existence.	3.60	1.03	3.29	0.82	1.91	NS
14.	The process of controlling parasitic weeds increases cost of production, weeds reduce farm yield and market value of produce.	2.98	0.93	2.97	0.83	0.11	NS
15.	Effects of pollution include illness and death of students and staff; pollution renders arable land unproductive.	3.63	0.71	3.59	0.69	0.57	NS
16.	Ozone layer destruction leads to increased amount of ultraviolet light on earth causing wilting of crops and dehydration problems in farms.	3.60	1.03	3.29	0.82	1.91	NS
17.	Flood causes abrupt closure of schools.	2.98	0.93	2.97	0.85	0.11	NS
18.	Flood claims student lives and school properties.	3.63	0.71	3.59	0.69	0.57	NS
19.	Green House Effect causes warming effect on the earth surface.	2.98	0.93	2.97	0.83	0.11	NS
20.	Flood inflicts psychological trauma to bereaved families.	3.63	0.71	3.59	0.71	0.11	NS

Key t-tab = (±1.96); DF = 148

The data reported in Table 3 indicates that all twenty (20) statements had mean ($\bar{X}$) values ranging from 2.52 to 3.63, all of which were above the criteria threshold of 2.50. Consequently, they are seen to be in agreement. All respondents unanimously agreed that the twenty (20) statements accurately reflected the impact of agro-ecological challenges on the school environment. The range of standard deviation values was from 0.71 to 1.24, which is below 1.96. This suggests that the respondents' replies were closely aligned with each other, supporting the validity of the questions.

Table 3 showed that the estimated t-values for all twenty assertions fell between 0.11 and 1.91. These values were lower than the t-tab ±1.96, df = 148, 0.05 alpha. As a result, it appears that there was no significant disparity in the average assessments of the feedback provided by agriculture administrators and instructors about the impacts of agro-ecological issues. Therefore, the null hypothesis of there being no significant difference was upheld for all 20 items.

Research Question 4

What are the remedial measures to agro-ecological problems affecting school environment?

$H0_4$: There is an insignificant disparity in the mean ratings of principals and teachers of agriculture on the remedial measures to agro-ecological problems on school environment.

Table 4: Mean Ratings and T-Test Analysis of the Mean Responses of Principals and Teachers of Agriculture on the Remedial Measures to Agro-Ecological Problems on School Environment ($n_1 + n_2 - 2$)

Item No.	Remedial Measures to Agro - Ecological Problems	Principal ($n_1 = 95$) $\bar{X}_1$	SD_1	Agric Teacher ($n_2 = 95$) $\bar{X}_2$	SD_2	t-cal	Remarks
1.	Adoption of sustainable forest management practices such as afforestation, cover cropping, crop rotation, agro-forestry.	3.18	0.87	3.40	0.69	1.68	NS
2.	Agro forestation, afforestation practices will remedy the problem of laterization and oceanification.	2.98	1.09	2.08	1.08	0.52	NS
3.	Encouraging silviculture will reduce oceanification.	3.32	0.73	3.20	0.95	0.81	NS
4.	Over grazing can be controlled through adoption of controlled grazing.	3.10		0.94	3.33	0.69	NS
5.	Rotational grazing enhances pasture regeneration.	3.63	0.71	3.59	0.69	0.57	NS
6.	Destruction of soil life can be controlled through maintenance of organic matter.	3.60	1.03	3.29	0.82	1.91	NS
7.	Erosion can be controlled by contour banks and wind breaks.	2.98	0.93	2.97	0.85	0.11	NS
8.	Drought problem can be solved through irrigation system.	3.60	1.71	3.59	0.69	0.57	NS
9.	Controlled bush burning to check the spread of bush fire.	2.98	0.93	2.97	0.85	0.11	NS
10.	Forest and wildlife conservation can be achieved through the adoption of sustainable forest management practices.	3.63		3.59	0.69	0.57	NS
11.	Remedies to shortage of firewood and water paucity include encouraging afforestation, re-afforestation and conservation programmes.	3.38	0.49	3.29	0.71	0.90	NS

12.	Adequate perimeter fencing of school premises.	3.23	0.49	3.29	0.71	0.90	NS
13.	Parasitic weeds can be controlled physically, mechanically and culturally.	3.08	0.87	3.11	0.93	0.18	NS
14.	Enforcing pollution management policies will remedy the problem of pollution.	3.20	0.76	3.19	0.62	0.09	NS
15.	Ozone layer depletion can be controlled through a combined programme of actions such as community education, participation and legislation.	3.60	0.81	3.53	0.89	0.47	NS
16.	Flooding could be reduced through construction of dams.	3.23	0.49	3.29	0.71	0.90	NS
17.	Green House Effects could be reduced through the use of incinerator.	3.60	0.81	3.53	0.89	0.47	NS

Key t-tab = ($\pm$1.96); DF = 148

The data in Table 4 indicates that the mean values ($\bar{X}$) of all seventeen (17) statements varied from 2.52 to 3.63, and all of them exceeded the criteria threshold of 2.50. Consequently, they are seen to be in agreement. All responders unanimously agreed that the seventeen (17) statements were effective solutions to address agro-ecological issues in the school environment. The standard deviation values were within the range of 0.71 to 1.24, which is below the threshold of 1.96. This suggests that the respondents' replies were closely aligned with each other, supporting the validity of the items.

Table 4 showed that the estimated t-values for all seventeen claims ranged from 0.01 to 1.91. These values were all lower than the t-tab ±1.96, df = 148, at 0.05 alpha. As a result, it appears that there was no significant disparity in the average evaluations of the feedback provided by principals and agricultural instructors about corrective actions for agro-ecological issues in the school environment. Therefore, the proposed null hypothesis, which suggests that there is no significant difference, was upheld for all 17 items.

Discussion of the Findings

The presentation of the study's conclusions adhered to the sequence of the research inquiries. The research found 23 agro-ecological concerns that damage the school environment based on the examination of the data presented in Table 1. The results of this study agree with the study of Suwari (2017) who reported on the rate of environmental degradation in the south southern part of Nigeria, which had adversely affected agricultural production hence famine and abject poverty. "A problem identified is half solved". It was in line with this dictum that this study identified twenty three (23) causes of agro-ecological problems as contained in Table 2.

The results of this research, are in harmony with the report of Osinem (2005) who indicted leaching, erosion, bush burning, deforestation, drought, ozone layer depletion and flood as responsible for agro-ecological degradation. Hence, Kimmins (2017) corroborated that the cumulative effects of agro-ecological degradation of school environment, is students' poor academic achievement because the school farm cannot be effectively used as an instructional material in the effective impartation of knowledge of practical agriculture.

In furtherance of the above, the study identified seventeen (17) remedial measures to agro-ecological problems in school environment as contained in Table 4. The results of this research, are in tandem with the advocacy of Knight (2015) who advised teachers of agriculture to adopt the following remedial measures: silviculture, controlling erosion and bush burning, perimeter fielding, use of incinerators, community education, participation and legislation.

Table 4 also suggests that there was an insignificant disparity in the mean ratings of principals and teachers of agriculture on the remedial measures to agro-ecological problems affecting school environment. The results of this research, affirmed the evidence given by Osinem (2005) who averred that principals view with that of teachers of agriculture concerning agro-ecological problems and their remedies, are the same since the environment is also the same.

Conclusion

The school environment particularly school farms in the study area are neither fertile nor productive hence cannot be used as an instructional material for the effective teaching and learning of practical agriculture. Therefore, the study investigated and found 15 agro-ecological problems, 23 causes of the problems, 20 effects and 17 remedial measures for the agro-ecological problems

affecting the school environment. Consequently, if the results of this research are turned into a student training handbook and packaged for teachers, environmentalists and policymakers in the education sector, it will remedy the agro-ecological problems affecting our citadel of learning and ultimately enhance students' academic achievement.

Recommendations

In light of the above, the study suggests that:

1. The identified agro-ecological problems that degrade secondary school environment should be brought to the notice of Ministry of Education, environmentalists, educational policy makers among others for collaboration to proffer best solution.
2. Problem identified is half solved. Hence, stakeholders in education should use the findings of the study as a guide to avoid the causes of agro-ecological problems.
3. Staff and students should adopt coping strategies of agro-ecological problems so as to mitigate the adverse effect on students' academic achievement.
4. Conscious efforts should be made by all stakeholders to adopt the identified remedial measures through workshop, conferences, agro-ecological degradation summit, and public campaigns.

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