GREENING AGRICULTURAL EDUCATION CURRICULUM FOR SUSTAINABLE WORKFORCE IN AGRICULTURAL PRODUCTION IN SOUTHEAST NIGERIA

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Abstract

This paper considered some approaches for enhancing graduates of agricultural education work skills towards social and economic transformation. It examined the integration of a green approach into agricultural education curriculum to develop a sustainable workforce for agricultural production in southeast Nigeria. Four research questions guided the study and four hypotheses were also formulated and tested at 0.05 level of significance. Descriptive survey research design was adopted for the study. Population of the study was 122 agricultural education lecturers and instructors in three selected higher institution that offers agricultural education in Enugu State. The entire population was used for the study because of the manageable size. Greening agricultural education curriculum item questionnaire made up of 78 items was used for data collection. The instrument was validated by three experts in Department of Technology and Vocational Education, Nnamdi Azikiwe University Awka. Cronbach Alpha reliability method was used to determine the internal consistency of the instrument. A Cronbach Alpha coefficient of 0.71, 0.82, 0.73 and 0.79 was obtained for the four clusters respectively. One hundred and twelve copies of the questionnaire were administered to the respondents by the researcher with the help of three research assistants. All the administered copies of the questionnaire were retrieved and analyzed using mean, standard deviation and t – test. Findings of the study revealed among others that agricultural education curriculum require element of green skills that will expose the students to sustainable work placement. It was therefore recommended that green skills should be included in the curriculum to provide green skills necessary for sustainable workforce.

***Keywords**:* Agricultural education, Curriculum, Sustainable workforce, Agricultural production, Southeast

Introduction

Agriculture is a vital sector that provides food, fiber, and other essential products for human survival. However, the productivity and sustainability of agriculture are increasingly being threatened by factors such as climate change, degradation of natural resources, and loss of biodiversity (Davis et al. 2017). According to Smith (2017) there is a growing need to develop a more sustainable workforce in agricultural production. One of the key strategies to achieve this is to green agricultural education curriculum which involves incorporating environmental sustainability principles and practices into agricultural education programs. By doing so, agricultural students can acquire the knowledge, skills, and attitudes needed to address the challenges facing modern agriculture and contribute to sustainable agricultural development. A green curriculum refers to integrating and incorporating environmental and sustainability concepts into learning (Zainab, 2023). Greening agricultural education curriculum refers to integrating

climate mitigation and adaptation strategies in teaching and learning at all levels of education as well as in teacher training (Dian, 2024). There are emphasis on environment, economy, and society. Greening agricultural education curriculum means ensuring that students are equipped with knowledge, skills and attitude to engage in the 21st century challenges of global warming and climate change (the most serious threat ever to face humanity), social inequities, unsustainable lifestyles, and the urgent need to switch to a renewable energy-based economy. Several studies have highlighted the importance of greening agricultural education curriculum for building a sustainable agricultural workforce. For example, a study by Swanson and Rajalahti (2020) found that integrating sustainability concepts into agricultural education programs can enhance students' understanding of environmental issues and their capacity to address them. Similarly, a study by Anderson and Feder (2016) demonstrated that incorporating sustainability principles into agricultural education can lead to improved student performance and greater interest in sustainable agricultural practices. In addition to enhancing students' knowledge and skills, greening agricultural education curriculum can also help build a more resilient and adaptive agricultural workforce. By exposing students to sustainable agricultural practices and technologies, they can develop the capacity to respond to changing environmental conditions and market demands.

Furthermore, greening agricultural education curriculum can also help address the growing demand for sustainable agricultural practices in the agricultural industry. FAO (2014) noted that as consumers increasingly prioritize sustainable and locally produced food, there is a need for a workforce that is well-equipped to implement environmentally friendly farming practices. Overall, greening agricultural education curriculum is essential for developing a sustainable workforce in agricultural production. By integrating sustainability principles and practices into agricultural education programs, students can acquire the knowledge, skills, and attitudes needed to address the challenges facing modern agriculture and contribute to sustainable agricultural production. However, to effectively carry out this task, there is need also to investigate agricultural education curriculum with need of fussing green skill into it.

The term curriculum refers to a planned instruction tailored towards students' educational activities and experiences in line with schools' instructional goals and objectives (Uwak, 2018). Curriculum can be seen as a systematically organized body of knowledge through which the goals of education can be achieved for the fulfillment of the needs and aspiration of any society. Agricultural education curriculum refers to the structured program of study and learning experiences designed to provide students with knowledge and skills related to agriculture, farming, agribusiness, and related fields. The curriculum typically includes a combination of theoretical classroom instruction, practical hands-on training, and experiential learning opportunities to help students develop a comprehensive understanding of agricultural concepts and practices (Davis et al. 2017). According to Ofir et al (2014) agricultural education curriculum aims to prepare students for careers in the agriculture industry by equipping them with the necessary knowledge, skills, and competencies. This includes understanding agricultural science, technology, and innovation, as well as practical skills such as crop cultivation, livestock management, soil conservation, pest control, and farm management. In addition to technical knowledge, agricultural education curriculum often includes components related to business and entrepreneurship, communication skills, leadership development and critical thinking (Barrick et al 2019). According to the authors these elements are essential for students to succeed in the dynamic and ever-evolving agriculture sector. In view of Spielman et al (2018) the curriculum may also include a focus on sustainability and environmental stewardship, teaching students about sustainable agricultural practices, resource conservation, and the importance of protecting natural resources. This is important for

preparing students to address the challenges of climate change, biodiversity loss, and food security in modern agriculture. Overall, the agricultural education curriculum is designed to provide students with a well-rounded education that prepares them for successful careers in agriculture while also promoting sustainable practices and responsible stewardship of natural resources. By incorporating a diverse range of topics and learning experiences, the curriculum aims to equip students with the knowledge, skills, and attitudes necessary to contribute to the advancement and sustainability of the agricultural education graduates (Wallace 2017).

An agricultural education graduate is an individual who has completed a program of study in agricultural education at the post-secondary level, typically earning a degree such as a Bachelor of Science in Agricultural Education, Master of Education in Agricultural Education, or Doctorate in Agricultural Education. According to Atchoarena et al (2019) an agricultural education graduate is equipped with a comprehensive understanding of agricultural concepts, practices, and technologies, as well as education and teaching methodologies. The author further stated that they are prepared to pursue careers in a variety of fields related to agriculture and education, including roles such as agricultural Educator: Agricultural education graduates often pursue careers as teachers or instructors in schools, colleges, universities, or vocational training centers. To Sauneke et al (2017) these graduates may teach courses on agricultural science, agribusiness, horticulture, animal science, and other related subjects to students of all ages. Similarly, Davis et al (2017) noted that they can work as extension educator. Agricultural education graduates may work as extension educators with agricultural extension programs, providing educational outreach to farmers, ranchers, and rural communities. They may conduct workshops, seminars, and training sessions on agricultural best practices, sustainable farming methods, and new technologies. Some agricultural education graduates may choose to work in administrative roles within educational institutions, such as serving as department chairs, curriculum developers, or program coordinators. They may oversee agricultural education programs, manage resources, and ensure educational quality and compliance. Agricultural education graduates may work as consultants, advising farmers, agribusinesses, policymakers, or non-profit organizations on agricultural issues, best practices, and strategies for sustainable farm management. Agricultural education graduates may pursue careers in research institutions, conducting research on agricultural education methods, curriculum development, agricultural policy, and sustainable farming practices. They may contribute to the advancement of knowledge in the field of agricultural education (FAO, 2014). Overall, agricultural education graduates play a crucial role in the agriculture industry by educating the next generation of farmers, agribusiness professionals, and agricultural leaders. They are prepared to promote sustainable practices, innovation, and responsible stewardship of natural resources in agriculture, contributing to the development and sustainability of greening agriculture.

Greening agriculture involves adopting sustainable practices that minimize negative environmental impacts while increasing productivity and food security (FAO, 2014). Green agriculture refers to the integration of environmental considerations into agricultural production systems to improve efficiency and reduce resource use (Ministry of Agriculture and Environment, 2018). The principle of greening agriculture focuses on enhancing biodiversity, conserving natural resources, and reducing the use of synthetic inputs (World Wildlife Fund, 2016). Greening agriculture aims to promote agroecological approaches that prioritize ecological sustainability and resilience for long-term agricultural production (Altieri & Nicholls, 2019). Greening agriculture involves reducing greenhouse gas emissions, promoting water conservation, and increasing energy efficiency in agricultural operations through sustainable workforce (European Commission, 2017). Sustainable workforce refers to creating and maintaining a diverse, engaged, and adaptable

workforce that is equipped with the necessary skills, knowledge, and resources to meet current and future organizational needs in a way that supports long-term success and well-being for both the employees and the organization.

In view of Eneji et al. (2021) Sustainable agricultural education focuses on educating students about sustainable farming practices, agroecology, conservation agriculture, and resource-efficient technologies. It emphasizes the integration of environmental, social, and economic considerations in agricultural production and management, fostering a holistic approach to farming that minimizes negative environmental impacts and promotes long-term sustainability. Ugwu et al. (2020) noted that the present reality of hardship has placed many people into aggressive production. Environment is being suppressed to give in more than require to the detriment of the future users. The author observed that the current situation requires a serious campaign for green production. The integration of greening practices and sustainability concepts into agricultural education curriculum poses significant challenges in preparing a sustainable workforce for agricultural production. While the importance of sustainable agriculture is widely recognized, there remains a gap in effectively incorporating greening education into the curriculum to equip students with the necessary skills and knowledge for environmentally-friendly practices in the agricultural sector. This gap hinders the development of a workforce that can address pressing environmental issues, implement sustainable farming methods, and contribute to long-term viability in agricultural production systems. Pressing issues in this regard include the lack of standardized greening curriculum, limited resources for training educators on sustainability practices, and the resistance to change from traditional agricultural education approaches. Without addressing these challenges, there is a risk of graduating agricultural professionals who are ill-equipped to navigate the complexities of sustainable agriculture and environmental stewardship, potentially compromising the resilience and sustainability of the agricultural workforce and production systems. It is based on this aforementioned gap that this study sought to examine the concept of greening agricultural education curriculum for sustainable workforce in Agricultural production in Southeast Nigeria

Purpose of the Study

The purpose of the study is to examine the concept of greening agricultural education curriculum for sustainable workforce in Agricultural production in Southeast Nigeria. Specifically, the study sought to:

1. Determine the greening concepts required in agricultural education curriculum

2. Ascertain the greening skills required by agricultural education graduates for sustainable workforce.

3. Find out the challenges hindering green skill integration in agricultural education curriculum

4. Proffer possible solutions to the challenges hindering green skill integration in agricultural education curriculum.

Research Questions

The following research questions guided the study.

1. What are the greening concepts required in agricultural education curriculum?

2. What are the greening skills needed by agricultural education graduates for sustainable workforce?

3. What are the challenges hindering green skill integration in agricultural education curriculum?

4. What are the possible solutions to the challenges hindering green skill integration in agricultural education curriculum?

Hypotheses

The following null hypotheses guided the study

1. There is no significant difference in the mean response of agricultural education lecturers and instructors on the greening concepts required in agricultural education curriculum
2. There is no significant difference in the mean response of agricultural education lecturers and instructors on the greening skills required by agricultural education graduates for sustainable workforce.
3. There is no significant difference in the mean response of agricultural education lecturers and instructors on the challenges hindering green skill integration in agricultural education curriculum
4. There is no significant difference in the mean response of agricultural education lecturers and instructors on the possible solutions to the challenges hindering green skill integration in agricultural education curriculum.

Methodology

The paper examined greening agricultural education curriculum for sustainable workforce in agricultural production in Southeast Nigeria. Four research questions in line with the specific purpose were formulated to guide the study and four hypotheses were also formulated and tested at 0.05 level of significance. Descriptive survey research design was adopted for the study. Population of the study was 86 agricultural education lecturers and 36 instructors in three selected higher institutions that offers agricultural education in Enugu State. The higher institutions that offer agricultural education are as follows UNN, FCE Eha-amufu and ESUT. The entire population was used for the study because of the manageable size. Greening agricultural education curriculum item questionnaire made up of 78 items was used for data collection. The instrument was validated by three experts in Department of Technology and Vocational Education, Nnamdi Azikiwe University Awka. Cronbach Alpha reliability method was used to determine the internal consistency of the instrument. A Cronbach Alpha coefficient of 0.71, 0.82, 0.73 and 0.79 was obtained for the four clusters respectively. One hundred and twenty-two copies of the questionnaire were administered to the respondents by the researcher with the help of three research assistants. All the administered copies of the questionnaire were retrieved and analyzed using mean and standard deviation. The decision rule for research questions was: any item with the mean value from 2.50 and above indicated that the respondents agreed, while any item with the mean value below 2.50 indicated disagreed. The null hypotheses were tested at 0.05 level of significance using t-test. Based on this, the null hypothesis of no significant difference was accepted when P-value is greater than the alpha value and vice versa.

Result

The results from the study were obtained from the research questions answered through data collection and analyzed as presented below.

Research Question 1:

What are the greening concepts required in agricultural education curriculum?

Data for answering research question 1 is presented in Table 1

Table 1

Mean responses of agricultural education lecturers and instructors on the greening concepts required in agricultural education curriculum.

S/N	Greening concepts required in agricultural education curriculum.	Mean	SD	Remark
1	Agroecological principles and practices	2.65	.86	Agreed
2	Conservation agricultural techniques	2.55	.50	Agreed
3	Organic farming methods	2.56	.51	Agreed
4	Precision agricultural techniques	2.96	.66	Agreed
5	Water conservation and management strategies	2.67	.77	Agreed
6	Agroforestory system	2.87	.82	Agreed
7	Soil health management	2.55	.90	Agreed
8	Biodiversity and habitat conservation	2.97	.75	Agreed
9	Climate-smart agriculture practices	2.73	.55	Agreed
10	Green house gas reduction strategies	2.55	.52	Agreed
11	Waste reduction and recycling in agriculture	2.64	.66	Agreed
12	Urban agriculture and community gardening	2.85	.75	Agreed
13	Agribusiness models for sustainability	2.86	.56	Agreed
14	Sustainable livestock production	2.66	.52	Agreed
15	Agricultural policy and regulation for environmental sustainability	2.74	.57	Agreed
16	Resilience building and adaptation to climate impact	2.51	.86	Agreed
17	Energy efficiency in agricultural operation	2.55	.86	Agreed
18	Innovative traditional techniques of crop and animal production	2.64	.77	Agreed

Result in table 1 shows that all the 18 items had their mean range from 2.50 to 2.97; hence they were all above the benchmark of 2.50. This shows that the respondents agreed that all the 18 items were greening concepts required in agricultural education curriculum. Similarly the standard deviations of all the 18 items ranged from .50 to .90 which indicates that all the respondents were not too far from the mean and were close to another in the opinion.

Research question 2

What are the greening skills needed by agricultural education graduates for sustainable workforce

Data for answering research question 2 is presented in Table 2

Table 2

Mean responses of agricultural education lecturers and instructors on the greening skills needed by agricultural education graduates for sustainable workforce.

S/N	Greening skills needed by agricultural education graduates for sustainable workforce.	Mean	SD	Remark
1	Sustainable farming practice	2.90	.50	Agreed
2	Resources efficiency management	2.50	.63	Agreed
3	Environmental impact assessment	2.65	.61	Agreed
4	Climatic change adaptation and mitigation strategies	2.78	.66	Agreed
5	Soil conservation and regeneration techniques	2.71	.62	Agreed
6	Water resources management	2.74	.88	Agreed
7	Agroforestery implementation abilities	2.66	.65	Agreed
8	Organic farming experts	2.74	.85	Agreed
9	Precision agriculture technologies proficiency	2.84	.88	Agreed
10	Data analysis and decision-making for sustainable agriculture	2.63	.48	Agreed
11	Sustainable livestock farming	2.81	.65	Agreed
12	Biodiversity conservation and habitat restoration skills	2.84	.50	Agreed
13	Sustainable crop rotation and diversification knowledge	2.73	.40	Agreed
14	Waste reduction and recycling techniques in agriculture	2.90	.97	Agreed
15	Sustainable supply chain management	2.71	.51	Agreed
16	Agribusiness sustainable planning	2.55	.88	Agreed
17	Renewable energy application in agriculture	2.72	.67	Agreed
18	Community engagement outreach for sustainability	2.56	.43	Agreed
19	Communication and advocacy for greening initiative	2.73	.67	Agreed
20	Integrated pest management (IPM) skills	2.66	.54	Agreed

Table 2 revealed that all the 20 items had their mean range from 2.50 to 2.90; hence they were all above the benchmark of 2.50. This shows that the respondents agreed that all the 20 items were greening skills needed by agricultural education graduates for sustainable workforce. Similarly the standard deviations of all the 20 items ranged from .43 to .97 which indicates that all the respondents were not too far from the mean and were close to another in the opinion.

Research question 3:

What are the challenges hindering green skill integration in agricultural education curriculum

Data for answering research question 3 is presented in Table 3

Table 3

Mean responses of agricultural education lecturers and instructors on the challenges hindering green skill integration in agricultural education curriculum

S/N	challenges hindering green skill integration in agricultural education curriculum	Mean	SD	Remark
1	Lack of funding for updating curriculum and resources to incorporate greening skills.	2.75	.56	Agreed

2	Resistance to change from traditional agricultural education practices.	2.66	.60	Agreed
3	Limited access to relevant teaching materials and resources on greening skills.	2.67	.55	Agreed
4	Insufficient training and professional development opportunities for educators on greening concepts.	2.62	.45	Agreed
5	Time constraints within the curriculum to include additional greening skills.	2.70	.61	Agreed
6	Limited collaboration and partnerships with industry for real-world application of greening skills	2.62	.60	Agreed
7	Inadequate alignment between educational institutions and industry needs for greening skills.	2.67	.62	Agreed
8	Limited awareness and understanding of the importance of greening skills among educators and students	2.62	.68	Agreed
9	Overemphasis on theoretical knowledge rather than practical application of greening skills	2.70	.67	Agreed
10	Lack of standardized assessment methods for greening skills in agricultural education.	2.64	.60	Agreed
11	Insufficient incentive structures for educators to prioritize greening skills in their teaching.	2.63	.62	Agreed
12	Inadequate infrastructure and facilities for hands-on learning of greening practices.	2.64	.62	Agreed
13	Resistance from stakeholders who may not prioritize sustainability in agricultural education.	2.61	.81	Agreed
14	Perceived trade-offs between greening skills and traditional agricultural productivity.	2.71	.83	Agreed
15	Limited access to experts and professionals in greening practices for training and mentorship.	2.62	.75	Agreed
16	Challenges in incorporating multidisciplinary approaches to teaching greening skills.	2.64	.73	Agreed
17	Lack of policy support and regulatory frameworks that promote greening skills in agricultural education.	2.87	.70	Agreed
18	Socio-economic factors impacting the prioritization of greening skills in educational institutions.	2.77	.82	Agreed
19	Inequities in access to agricultural education programs that offer greening skill training.	2.65	.66	Agreed
20	Limited research and data on the efficacy and outcomes of integrating greening skills in agricultural education curriculum.	2.64	.62	Agreed

Result from table 3 revealed that all the 20 items had their mean range from 2.61 to 2.87; hence they were all above the benchmark of 2.50. This shows that the respondents agreed that all the 20 items were challenges hindering green skill integration in agricultural education curriculum. Similarly the standard deviations of all the 20 items ranged from .45 to .83 which indicates that all the respondents were not too far from the mean and were close to another in the opinion.

Research question 4:

What are possible solutions to the challenges hindering green skill integration in agricultural education curriculum?

Data for answering research question 4 is presented in Table 4

Table 4:

Mean responses of agricultural education lecturers and instructors on possible solutions to the challenges hindering green skill integration in agricultural education curriculum

S/N	Possible solutions to the challenges hindering green skill integration in agricultural education curriculum	Mean	SD	Remark
1	Increase funding for agricultural education programs to support the development and implementation of greening skill curriculum.	2.88	.66	Agreed
2	Provide professional development and training opportunities for educators to enhance their understanding and teaching of greening skills	2.76	.71	Agreed
3	Establish partnerships with industry and agricultural organizations to ensure curriculum alignment with current and future workforce needs.	2.70	.84	Agreed
4	Develop and disseminate teaching materials and resources on greening skills for educators and students.	2.74	.57	Agreed
5	Create incentives and recognition programs for educators who prioritize and excel in teaching greening skills.	2.53	.75	Agreed
6	Advocate for policy support and regulatory frameworks that promote the integration of greening skills in agricultural education	2.68	.85	Agreed
7	. Integrate hands-on, experiential learning opportunities for students to apply greening skills in real-world settings.	2.50	.66	Agreed
8	Provide access to industry experts and professionals for mentorship and guest lectures on greening practices.	2.58	.81	Agreed
9	Incorporate case studies and practical examples of successful greening initiatives in the curriculum.	2.67	.86	Agreed
10	Encourage interdisciplinary collaboration across departments and institutions to integrate greening skills into agricultural education	2.68	.95	Agreed
11	. Establish community partnerships and engagement projects to connect students with local greening initiatives.	2.76	.75	Agreed
12	Conduct research and evaluation studies to assess the impact and effectiveness of greening skill integrations in agricultural education.	2.88	.95	Agreed
13	Develop assessment tools and metrics to measure student learning and proficiency in greening skills	2.70	.62	Agreed
14	Promote awareness and advocacy for the importance of greening skills in agricultural education	2.61	.73	Agreed
15	Create networking opportunities for educators and students to share best practices and resources related to greening skills.	2.67	.81	Agreed
16	Collaborate with funding agencies and donors to secure grants and sponsorships for greening skill integration projects.	2.76	.88	Agreed
17	Facilitate networking and mentorship programs between students, educators, and professionals in the field of sustainable agriculture.	2.60	.73	Agreed
18	Incorporate field trips, internships, and hands-on projects that expose students to diverse greening practices and technologies.	2.67	.62	Agreed
19	Offer scholarships and financial support for students pursuing studies in greening skills and sustainable agriculture.	2.55	.67	Agreed
20	Establish a clear pathway for students to apply their greening skills in research, innovation, and entrepreneurship within the agricultural sector.	2.98	.87	Agreed

Findings from research question four as presented in Table 4 revealed that all the 20 items had their mean range from 2.53 to 2.98, hence they were all above the bench mark of 2.50. This shows that the respondents agreed that all the 20 items were possible solutions to the challenges hindering green skill

integration in agricultural education curriculum. Similarly, the standard deviations of all the 20 items ranged from .62 to .95 which indicates that all the respondents were not too far from the mean and were close to another in the opinion.

Test of statistical significance of Hypotheses

Hypothesis 1

There is no significant difference in the mean response of agricultural education lecturers and instructors on greening concept required in agricultural education curriculum.

Test hypothesis 1 is presented in table 5

Table 5

t-test result of agricultural education lecturers and instructors on greening concept required in agricultural education curriculum

Variables	N	Mean	SD	df	t-test	p-value	Remark
Lecturers	86	2.67	0.68				
				110	-5.65	1.98	NS
Instructors	36	2.72	0.42				
Total	122						

Sources: Field survey 2024

The results from the mean responses of agricultural education lecturers (M = 2.67, SD = 0.68) and instructors (M = 2.72, SD = 0.42) on greening concept required in agricultural education curriculum does not differ significantly, $t(110) = -5.65$, $p = 1.98$.

Hypothesis 2

There is no significant difference in the mean response of agricultural education lecturers and instructors on greening skills required by agricultural education graduates for sustainable workforce.

Test hypothesis 2 is presented in table 6

Table 6

t-test result of agricultural education lecturers and instructors on greening skills required by agricultural education graduates for sustainable workforce.

Variables	N	Mean	SD	df	t-test	p-value	Remark
Lecturers	86	2.83	0.66				
				110	-5.67	1.52	NS
Instructors	36	2.58	0.57				
Total	122						

Sources: Field survey 2024

The results from the mean responses of agricultural education lecturers (M = 2.83, SD = 0.66) and instructors (M = 2.58, SD = 0.57) on greening skills required by agricultural education graduates for sustainable workforce does not differ significantly, $t(110) = -5.67$, $p = 1.52$.

Hypothesis 3

There is no significant difference in the mean response of agricultural education lecturers and instructors on the challenges hindering green skill integration in agricultural education curriculum

Test hypothesis 3 is presented in table 7

Table 7

t-test result of agricultural education lecturers and instructors on the challenges hindering green skill integration in agricultural education curriculum

Variables	N	Mean	SD	df	t-test	p-value	Remark
Lecturers	86	2.67	0.34				
				110	-5.61	1.71	NS
Instructors	36	2.81	0.61				
Total	122						

Sources: Field survey 2024

The results from the mean responses of agricultural education lecturers (M = 2.67, SD = 0.34) and instructors (M = 2.81, SD = 0.61) on the challenges hindering green skill integration in agricultural education curriculum does not differ significantly, $t(110) = -5.61$, $p = 1.71$.

Hypothesis 4

There is no significant difference in the mean response of agricultural education lecturers and instructors on the possible solutions to the challenges hindering green skill integration in agricultural education curriculum.

Test hypothesis 4 is presented in table 8

Table 8

t-test result of agricultural education lecturers and instructors on the possible solutions to the challenges hindering green skill integration in agricultural education curriculum

Variables	N	Mean	SD	df	t-test	p-value	Remark
Lecturers	86	2.68	0.66				
				110	-5.71	1.88	NS
Instructors	36	2.44	0.57				
Total	122						

Sources: Field survey 2024

The results from the mean responses of agricultural education lecturers (M = 2.68, SD = 0.66) and instructors (M = 2.44, SD = 0.57) on the possible solutions to the challenges hindering green skill integration in agricultural education curriculum does not differ significantly, $t(110) = -5.71$, $p = 1.88$.

Discussion

The study found that 18 items are greening concept required in agricultural education curriculum. The study found no significant differences in the mean rating of lecturers and instructors on the greening concept required in agricultural education curriculum. The findings affirm the study conducted by Anderson (2016) on the green skill technological practices in

agricultural production. The author noted that organic farming methods, precision agriculture technologies, water conservation and management strategies, integrated pest management (IPM) approaches, agroforestry systems, soil health management, biodiversity and habitat conservation, climate-smart agriculture practices, greenhouse gas reduction strategies, energy efficiency in agricultural operations, sustainable food production and distribution systems, waste reduction and recycling in agriculture, urban agriculture and community gardening are some of the important green concept practices that should be adopted in agricultural production

Also, the study found out 20 items on greening skills required by agricultural education graduates for sustainable workforce. The study found no significant differences in the mean rating of lecturers and instructors on the greening skills required by agricultural education graduates for sustainable workforce. The findings of the study is in consonance with Clark, (2018) who observed that technology improvement is moving on a high speed and such green skills need to be promoted to help minimize the impact of technology on the environment by farmers. The author noted that young graduates need to embrace certain skills that will give them more job opportunity in the labour market and this job are mainly found in green skills.

Similarly, the study found 20 challenges hindering green skill integration in agricultural education curriculum. The study found no significant differences in the mean rating of lecturers and instructors on the challenges hindering green skill integration in agricultural education curriculum. The findings is in agreement with Altieri and Nicholls (2019), who observed that green skill is a welcome development but a lot of obstacles are hindering the realization of it in the society. The authors emphasized that some of these challenges hindering green skills adoption in schools are lack of funding for updating curriculum and resources to incorporate green skills, resistance to change from traditional agricultural education practices, limited access to relevant teaching materials and resources on greening skills, insufficient training and professional development opportunities for educators on greening concepts, time constraints within the curriculum to include additional greening skills, limited collaboration and partnerships with industry for real-world application of greening skills, inadequate alignment between educational institutions and industry needs for greening skills, limited awareness and understanding of the importance of greening skills among educators and students. These according to the authors require immediate attention to set green skill activities into motion in agricultural education curriculum.

On possible solutions to the challenges hindering green skill integration in agricultural education curriculum, the study found out 20 items on the solutions to green skill integration in agricultural education curriculum. Similarly, the study found no significant differences in the mean rating of lecturers and instructors. The findings of the study is in line with Jones and Lee (2014) who observed that if certain measures are put in place it can bring a good return of green skills in agricultural education curriculum. According to the authors, some of those measures are increase funding for agricultural education programs to support the development and implementation of greening skill curriculum, provide professional development and training opportunities for educators to enhance their understanding and teaching of greening skills, establish partnerships with industry and agricultural organizations to ensure curriculum alignment with current and future workforce needs, develop and disseminate teaching materials and resources on greening skills for educators and students, create incentives and recognition programs for educators who prioritize and excel in teaching greening skills, advocate for policy support and regulatory frameworks that

promote the integration of greening skills in agricultural education, integrate hands-on, experiential learning opportunities for students to apply greening skills in real-world settings, provide access to industry experts and professionals for mentorship and guest lectures on greening practices, incorporate case studies and practical examples of successful greening initiatives in the curriculum, encourage interdisciplinary collaboration across departments and institutions to integrate greening skills into agricultural education, establish community partnerships and engagement projects to connect students with local greening initiatives.

Conclusion

This study has identified the concept of greening agricultural education curriculum for sustainable workforce in Agricultural production in Southeast Nigeria. The findings of the study focused on the specific purposes that guided the study which are greening concepts required in agricultural education curriculum, greening skills required by agricultural education graduates for sustainable workforce, challenges hindering green skills integration in agricultural education curriculum and possible solutions to the challenges hindering green skills integration in agricultural education curriculum. It is believed that taking into consideration of the above items will help to boost the greening of agricultural education curriculum.

Recommendations

Based on the findings of the study, the following recommendations are made

1. There should be sensitization on the greening skills concept that ought to be embedded in the curriculum for learning of agriculture.
2. These green skills required for job placement of agricultural education graduates should be taught to them by first of all enshrining them in curriculum
3. Challenges facing green skill integration in curriculum should be a concern for all stakeholders in agricultural sector. With a pool of effort, something positive will emerge.
4. Green skills concept should be included in the curriculum to provide green skills necessary for sustainable workforce.

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