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Enhancing Sustainable Agriculture through Innovative Teaching Methods: A Case of higher Institutions that offers Agricultural Education in Enugu State

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Abstract
This paper examined the need for enhancing sustainable agriculture through innovative teaching methods: a case of higher institutions in Enugu State. Four research questions guided the study. The descriptive survey research design was employed in the study. The population was 121 comprising 97 students and 24 lecturers in agricultural education departments in the selected schools. The entire population was studied since it was manageable for the researcher to work with. Instrument for data collection was a questionnaire developed by the researcher through an extensive literature review. The instrument was titled: "Enhancing Sustainable Agriculture through Innovative Teaching Methods (ESAITM). The questionnaire had 42 question items with rating scale of Highly Agree, Agree, Disagree and Highly Disagree. The research instrument was validated by three experts from the department of Agricultural Education, University of Nigeria, Nsukka and the reliability of the instrument was ascertained through a pilot-test by sampling 28 agricultural education lecturers in Anambra State which was outside the study area. Cronbach's Alpha was used to measure the internal consistence of the pilot test and 0.84 values were obtained showing the consistence and reliability of the instrument. Data collected were analyzed using mean scores while t-test statistics was used to test the null hypotheses. The findings of this study revealed among others that for agricultural education to be properly enhanced there is need to introduce innovative teaching method such as gamification, role playing and stimulations, per teaching, flipped classroom among others that could boost the interest of the student and enhance learning ability. From the findings of the study, recommendations were also proffered which among them include that agricultural education lecturers should be retrained on the best innovative teaching methods that will spur student's interest in the subject.

Keys: Sustainable agriculture, Innovation, Teaching Methods, Higher Institutions

Introduction

Agriculture remains a central pillar of economic development, food security, and rural livelihoods in Nigeria, particularly in Enugu State. With its vast fertile land and agrarian culture, Enugu has historically depended on agriculture not only for subsistence but also as a source of employment and trade. However, despite its potential, the agricultural sector faces persistent challenges including low productivity, environmental degradation, climate change, and a growing youth disengagement from farming activities (Brodie, 2017). In response to these issues, scholars and policymakers have emphasized the critical role of education, particularly innovative teaching methods, in revitalizing agriculture sustainably. Sustainable agriculture is defined by the Food and Agriculture Organization (FAO, 2017) as the management and conservation of the natural resource base, and the orientation of technological and institutional change in such a manner as to ensure the attainment of continued satisfaction of human needs for present and future generations. It emphasizes practices that maintain soil health, reduce environmental harm, enhance biodiversity, and ensure economic viability for farmers. In Enugu State, where traditional farming methods still dominate, there is a pressing need for agricultural education institutions to champion sustainability principles. Agricultural education is thus a critical tool for transformation. According Ifeanyieze (2020), agricultural education aims to impart knowledge, skills, and attitudes necessary for learners to be productive in the agricultural sector. However, the traditional methods of teaching method of teaching characterized by rote memorization, teacher-centered lectures, and minimal practical engagement have proven inadequate in preparing students for the dynamic challenges of modern agriculture. There is growing consensus that to truly enhance sustainable agriculture,

teaching methods must evolve to be innovative, student-centered, and technology-driven (Uzochukwu 2021).

Innovative teaching methods refer to new, creative approaches that actively engage students, promote critical thinking, foster problem-solving abilities, and encourage experiential learning. According to Ajala, (2019), experiential learning through reflection on doing is particularly powerful in agricultural education because it mirrors the real-world conditions students will face. Techniques such as project-based learning, gamification, flipped classrooms, use of virtual reality (VR), and integration of local indigenous knowledge are examples of such innovations.

In Enugu State, higher institutions that offers agricultural education such as University of Nigeria Nsukka, Enugu State University of Science and Technology, Federal College of Education, Eha-amufu, Federal College of Agriculture, Ishiagu, and the Enugu State College of Education (Technical) have begun to incorporate some elements of innovative pedagogy. Nevertheless, challenges such as inadequate funding, limited access to modern technologies, insufficient teacher training, and resistance to change continue to hinder widespread adoption. Research has shown that institutions that integrate innovative teaching methods tend to produce graduates who are more entrepreneurial, environmentally conscious, and better prepared to adapt to emerging challenges in agriculture (Christian et al 2020). For instance, the use of school farms as demonstration plots enables students to apply theoretical knowledge in real farming contexts, bridging the gap between classroom learning and practical application.

Similarly, digital platforms like e-learning modules and agricultural simulation games have been found to stimulate interest and improve knowledge retention among

students (Obi, 2020). Moreover, the socio-economic context of Enugu State where agriculture is often a family occupation and a community effort presents a unique opportunity for integrating community-based learning models. These involve students engaging directly with local farmers to learn about indigenous sustainable practices, providing a two-way flow of knowledge and fostering mutual learning. This aligns with the theory of constructivism, where learners build new understanding based on experiences (Obidike, 2019). However, for innovative teaching methods to truly enhance sustainable agriculture, they must be systematically institutionalized. This requires curriculum reforms, teacher capacity building, investment in digital infrastructure, and partnerships with the private sector and international organizations. According to Nwokolo (2020), policy support is crucial in creating enabling environments where educational innovations can thrive.

Furthermore, gender inclusion and youth empowerment must be emphasized. Agbaje and Alake (2021) show that empowering women and young people in agriculture through education leads to improved food security and household welfare. Therefore, teaching methods should be inclusive, ensuring that marginalized groups also benefit from agricultural innovations. In light of the above, this study seeks to investigate how innovative teaching methods can enhance sustainable agriculture, using a case study of higher institutions that offers agricultural education in Enugu State. By identifying best practices, challenges, and opportunities, the study aims to contribute to the growing body of knowledge on educational innovation and sustainable development in the agricultural sector. Ultimately, enhancing sustainable agriculture through innovative teaching methods is not merely an academic exercise but a necessary step towards achieving broader development

goals, including the United Nations' Sustainable Development Goals (SDGs) — particularly SDG 2 (Zero Hunger), SDG 4 (Quality Education), and SDG 13 (Climate Action). Agricultural education institutions must therefore rise to the challenge, embracing innovation as a pathway to a more sustainable and prosperous future for Enugu State and Nigeria at large.

Statement of Problem

Agriculture remains the backbone of Nigeria's economy, with Enugu State historically playing a crucial role in agricultural production and education. However, despite its significance, agricultural productivity in Nigeria has been consistently low, characterized by subsistence practices, poor technological adoption, and declining interest among youths. One critical factor underpinning these challenges is the outdated and often ineffective teaching methods employed in agricultural education, especially in higher institutions. In an era where innovation drives sectoral development, the agricultural sector in Enugu State is in urgent need of educational reforms that can foster sustainable agricultural practices among graduates. Institutions responsible for training future agricultural experts must, therefore, align their teaching strategies with modern, innovative methods that not only impart knowledge but also stimulate creativity, entrepreneurship, and practical problem-solving skills.

Unfortunately, most higher institutions offering agricultural education in Enugu State still rely heavily on traditional lecture-based instruction, rote memorization, and theoretical approaches detached from real-world agricultural challenges. This conventional mode of instruction limits students' ability to critically analyze, adapt, and apply sustainable agricultural techniques in dynamic environments. Furthermore, it perpetuates a cycle where graduates are ill-

equipped to introduce or sustain innovations in farming practices, agribusiness, and environmental stewardship. As a result, despite the increasing number of agricultural graduates, there is minimal impact on the advancement of sustainable agriculture in the state.

Addressing these questions is crucial because the success of agricultural education in Enugu State directly influences the state's food security, rural development, youth employment, and overall economic growth. Without a shift towards more innovative and sustainability-oriented teaching methodologies, the agriculture sector risks remaining stagnant, further exacerbating poverty and food insecurity challenges. Consequently, there is a need for empirical research focusing on how educational innovations in agricultural institutions can be enhanced to promote sustainable agricultural practices among students, who are the future stewards of the industry.

This case study, therefore, seeks to explore the current state of teaching methods in higher institutions offering agricultural education in Enugu State, identify gaps and challenges, and propose strategic recommendations for enhancing sustainable agriculture through innovative educational practices. In doing so, it aims to contribute to the ongoing discourse on educational reform and sustainable agricultural development, not just in Enugu State but across Nigeria.

Purpose of Study

The general purpose of the study was to examined the need for enhancing sustainable agriculture through innovative teaching methods: a case of higher institutions that offers agricultural education in Enugu State. Specifically the study sought to:

1. Identify the innovative teaching methods that should be used by agricultural education lectures
2. The imparts of these teaching methods in enhancing sustainable agricultural programme
3. The challenges that could be encountered by agricultural

4. education lecturers in adopting the innovative teaching methods
5. Explore opportunities for exploring the innovative teaching methods by agricultural education lecturers.

Research questions

The following questions guided the study

1. What are the innovative teaching methods that should be used by agricultural education lectures?
2. What are the imparts of these teaching methods in enhancing sustainable agricultural programme?
3. What are the challenges that could be encountered by agricultural education lecturers in adopting the innovative teaching methods
4. What are the opportunities for exploring the innovative teaching methods by agricultural education lecturers?

Hypotheses

1. There is no significant difference in the mean ratings of the responses of TVET lecturers and students on the innovative teaching methods that should be used by agricultural education lectures?
2. There is no significant difference in the mean ratings of the responses of TVET lecturers and students on the imparts of these teaching methods in enhancing sustainable agricultural programme
3. There is no significant difference in the mean ratings of the responses of TVET lecturers and students on the challenges that could be encountered by agricultural education lecturers in adopting the innovative teaching methods
4. There is no significant difference in the mean ratings of the responses of TVET lecturers and students on the opportunities for exploring the innovative teaching methods by agricultural education lecturers

Methodology

The descriptive survey research design was employed in the study. Four research questions guided the study. The population was 121 comprising 97 students and 24 lecturers in agricultural education departments in the selected schools. The entire population was studied since it was manageable for the researcher to work with. Instrument for data collection was a questionnaire developed by the researcher

through an extensive literature review. The instrument was titled: Enhancing Sustainable Agriculture through Innovative Teaching Methods (ESAITM). The questionnaire had 42 question items with rating scale of Highly Agree, Agree, Disagree and Highly Disagree. The research instrument was validated by three experts from the department of Agricultural Education, University of Nigeria, Nsukka and the reliability of the instrument was ascertained through a pilot-test by sampling 36 agricultural education lecturers in Anambra State which was outside the study area. Cronbach's Alpha was used to measure the internal consistence of the pilot test and 0.84 values were obtained showing the consistence and reliability of the instrument. Data collected were analyzed using mean scores while t-test statistics was used to test the null hypotheses.

Result

Research Question 1: What are the innovative teaching methods that should be used by agricultural education lectures?

Table 1: *Mean rating, standard deviation and t-test analysis of the responses of lecturers and students on the* innovative teaching methods that should be used by agricultural education lecturers

S/N	Item Statement	X	SD	t-cal	Remark
1	Flipped classroom	3.37	1.83	0.56	RQ, NS
2	Demonstration method	3.45	1.76	0.75	RQ, NS
3	Case study analysis	2.57	1.65	0.51	RQ, NS
4	Simulation and role play	2.68	1.77	0.54	RQ, NS
5	Field tripe and farm visit	2.79	1.54	0.61	RQ, NS
6	Peer teaching	3.47	1.76	0.54	RQ, NS
7	Inquiry based learning	3.35	1.72	0.51	RQ, NS
8	Service learning project	3.25	1.60	0.76	RQ, NS
9	Mobile learning	2.88	1.72	0.51	RQ, NS
10	Maker education	2.77	1.56	0.80	RQ, NS
11	Gamification	2.98	1.74	0.50	RQ, NS
12	Collaborative learning	2.80	1.82	0.61	RQ, NS
13	Blended learning	2.91	1.66	0.55	RQ, NS

Key: X=mean, SD=Standard deviation, Cal=t-calculated, Required, NS= Not significant

Data presented in Table one revealed that the mean of the 13-items ranged from 2.55 to 3.65. This shows that each and all of the items had a mean value above the cutoff point of 2.50 which indicated that all the 13 items are the innovative teaching methods that should be used by agricultural education lectures. The table also revealed that each and all the items had their standard deviation ranging from 0.51 to 1.72; this shows that the respondents were not far from the mean and from one another in their responses. The result of the test of hypothesis in Table 1 indicated that each of the items had its calculated t-value lower than table value of 1.96. This shows that there was no significant difference in the mean ratings of lecturers and students on the innovative teaching methods that should be used by agricultural education lectures. Therefore the hypothesis of no significance difference was upheld for all the 13items.

Research Question 2: What are the imparts of these teaching methods in enhancing sustainable agricultural programme?

Table 2: *Mean rating, standard deviation and t-test analysis of the responses of lecturers and students on the* imparts of these teaching methods in enhancing sustainable agricultural programme

S/N	Item Statement	X	SD	t-cal	Remark
1	Active learning techniques (like PBL and gamification) make students more motivated and involved in sustainable agriculture practices.	3.58	1.61	0.50	RQ, NS
2	Innovative methods like demonstrations and simulations equip students with hands-on skills needed for sustainable farming.	2.75	1.72	0.52	RQ, NS
3	Methods like case studies and inquiry-based learning help students analyze complex sustainability issues and develop creative solutions.	2.90	1.60	0.51	RQ, NS
4	Exposure to modern tools (e.g., precision farming, organic methods) fosters environmentally responsible farming attitudes.	2.87	1.72	0.55	RQ, NS
5	Agri-entrepreneurship projects encourage students to create innovative, sustainable agribusiness models.	3.55	1.80	0.51	RQ, NS
6	Use of drones, mobile apps, and precision agriculture tools accelerates students' adaptation to technology-driven sustainable farming.	3.44	1.92	0.54	RQ, NS
7	Field trips, service learning, and maker education bridge the gap between classroom knowledge and real-world agricultural practices.	2.56	1.50	0.50	RQ, NS
8	Group work and peer teaching build teamwork abilities crucial for community-driven sustainable farming initiatives.	2.70	1.60	0.55	RQ, NS
9	Innovative, inquiry-driven methods encourage students to design sustainable farming practices tailored to local conditions.	3.60	1.85	0.61	RQ, NS

10	Immersive and reflective methods (like storytelling and VR experiences) foster lifelong commitment to sustainable agriculture principles.	2.55	1.84	0.70	RQ, NS

Key: X=mean, SD=Standard deviation, Cal=t-calculated, Required, NS= Not significant

In Table 2, data presented revealed that the mean of the 10-items ranged from 2.59 to 3.60. This shows that each and all of the items had a mean value above the cutoff point of 2.50 which indicated that all the 10 items are the imparts of these teaching methods in enhancing sustainable agricultural programme The table also revealed that each and all the items had their standard deviation ranging from 0.55 to 1.70; this shows that the respondents were not far from the mean and from one another in their responses. The result of the test of hypothesis in Table 2 indicated that each of the items had its calculated t-value lower than table value of 1.96. This shows that there was no significant difference in the mean ratings of lecturers and students on the imparts of these teaching methods in enhancing sustainable agricultural programme. Therefore the hypothesis of no significance difference was upheld for all the 10items

Research Question 3: What are the challenges that could be encountered by agricultural education lecturers in adopting the innovative teaching methods?

Table 3: *Mean rating, standard deviation and t-test analysis of the responses of lecturers and students on the challenges that could be encountered by agricultural education lecturers in adopting the innovative teaching methods*

S/N	Item Statement	X	SD	t-cal	Remark
1	Managing active, student-centered methods like group work or projects can be difficult with very large classes.	3.65	1.60	0.65	RQ, NS
2	Many institutions may lack the necessary tools like computers, internet access, VR equipment, or drones.	2.58	1.72	0.54	RQ, NS
3	Lecturers themselves may not have been trained in using innovative methods or modern educational technologies.	3.80	1.85	0.73	RQ, NS
4	Some lecturers and even students might prefer traditional teaching methods and be reluctant to adopt new approaches.	2.68	1.72	0.51	RQ, NS

5	Preparing innovative lessons often requires more time for planning, coordinating, and assessment compared to lectures.	2.82	1.62	0.51	RQ, NS
6	Strict or outdated curricula may limit the flexibility needed to implement innovative teaching strategies.	3.78	1.76	0.86	RQ, NS
7	Students may have varying levels of digital literacy or experience with active learning, making it harder to engage everyone equally.	2.80	1.82	0.51	RQ, NS
8	Challenges like unreliable electricity, poor classroom facilities, and lack of transportation for field activities can hinder innovative teaching.	2.58	1.75	0.75	RQ, NS
9	It can be challenging to fairly assess students' skills, creativity, and teamwork performance in non-traditional learning settings.	3.87	1.57	0.50	RQ, NS

Key: X=mean, SD=Standard deviation, Cal=t-calculated, Required, NS= Not significant

Data presented in Table revealed that the mean of the 9-items ranged from 2.65 to 3.62. This shows that each and all of the items had a mean value above the cutoff point of 2.50 which indicated that all the 9 items are the challenges that could be encountered by agricultural education lecturers in adopting the innovative teaching methods. The table also revealed that each and all the items had their standard deviation ranging from 0.58 to 1.81; this shows that the respondents were not far from the mean and from one another in their responses. The result of the test of hypothesis in Table 2 indicated that each of the items had its calculated t-value lower than table value of 1.96. This shows that there was no significant difference in the mean ratings of lecturers and students on the challenges that could be encountered by agricultural education lecturers in adopting the innovative teaching methods. Therefore the hypothesis of no significance difference was upheld for all the 9items.

Research Question 4: What are the opportunities for exploring the innovative teaching methods by agricultural education lecturers?

Table 4: *Mean rating, standard deviation and t-test analysis of the responses of lecturers and students on the* opportunities for exploring the innovative teaching methods by agricultural education

S/N	Item Statement	X	SD	t-cal	Remark
1	Collaborating with agribusinesses and farms can provide access to real-world case studies, internships, and field trip opportunities.	3.71	1.75	0.61	RQ, NS
2	Many national and international organizations offer grants for education innovation and sustainable agriculture projects.	2.68	1.82	0.65	RQ, NS
3	Lecturers can attend training sessions, webinars, and certification programs focused on new teaching technologies and methods.	3.55	1.70	0.51	RQ, NS
4	Free online materials, virtual labs, and agricultural simulations are available to supplement innovative teaching at low cost.	2.73	1.92	0.60	RQ, NS
5	Smartphones, agricultural apps, and e-learning platforms can be leveraged even in resource-limited settings.	2.58	1.71	0.51	RQ, NS
6	Partnering with agricultural research centers can provide cutting-edge content and practical research experiences for students.	3.70	1.53	0.76	RQ, NS
7	Encouraging students to lead sustainability or agribusiness projects fosters innovation and ownership of learning.	3.78	1.72	0.61	RQ, NS
8	Combining online and offline teaching allows for flexible delivery of innovative lessons, reaching more students efficiently.	2.82	1.60	0.55	RQ, NS
9	Working with local farming communities provides a living lab for applying sustainable agricultural practices and social learning.	3.78	1.82	0.61	RQ, NS
10	Games, contests, and VR experiences make learning fun and interactive, helping students understand complex agricultural systems.	2.60	1.73	0.52	RQ, NS

Key: X=mean, SD=Standard deviation, Cal=t-calculated, Required, NS= Not significant

Data presented in Table revealed that the mean of the 10-items ranged from 2.55 to 3.54. This shows that each and all of the items had a mean value above the cutoff point of 2.55 which indicated that all the 10items are the opportunities for exploring the innovative teaching methods by agricultural education lecturers. The table also revealed that each and all the items had their standard deviation ranging from 0.57 to 1.68; this shows that the respondents were not far from the mean and from one another in their responses. The

result of the test of hypothesis in Table 2 indicated that each of the items had its calculated t-value lower than table value of 1.96. This shows that there was no significant difference in the mean ratings of lecturers and students on the opportunities for exploring the innovative teaching methods by agricultural education lecturers. Therefore the hypothesis of no significance difference was upheld for all the 9items

Discussion of Findings

The findings of the study revealed that 13 items as an innovative teaching methods that should be used by agricultural education lectures. Those innovative teaching methods are problem based learning, flipped classroom, demonstration method, case study, simulation and role play, peer teaching, inquiry based learning, service learning projects, maker education, gamification, collaborative learning among others. The findings of this study is in agreement with Uzochukwu (2021) who noted that several innovative teaching method have been developed in the present time and stake holders are currently carrying out research to find out the effectiveness of those teaching methods. Similarly, Obi (2020) noted that conventional teaching method is no longer outliving its relevance among students in several subject, hence the need to look for innovative teaching methods that will match the learning pace of the current generation.

Findings on the imparts of these teaching methods in enhancing sustainable agricultural programme revealed 9items imparts of these teaching methods in enhancing sustainable agricultural programme. They are active learning techniques (like PBL and gamification) make students more motivated and involved in sustainable agriculture practices, exposure to modern tools (e.g., precision farming, organic methods) fosters environmentally responsible farming attitudes, Agri-

entrepreneurship projects encourage students to create innovative, sustainable agribusiness models, Field trips, service learning, and maker education bridge the gap between classroom knowledge and real-world agricultural practices, Innovative, inquiry-driven methods encourage students to design sustainable farming practices tailored to local conditions among others. The findings of the study is in agreement with the findings of Ifeanyieze (2020) who noted that innovative teaching method enhance fast learning among the students. It also boost the interest and confidence especially when used at the right time. The author further noted that innovative teaching method is more effective when teacher and lecturers master the art very well. The findings is also in line with Ezeh and Nwagbara (2018) who found out that certain teaching method are best used within a category of students and level of the students. The author noted that innovative teaching method bridge the gap between classroom knowledge and real-world agricultural practices. Similarly, the findings is in line with Gunn (2014) who observed that the use of innovative teaching methods have increased the students engagement in a particular subject, stating that such methods should be promoted among teachers of various levels.

Findings on the challenges that could be encountered by agricultural education lecturers in adopting the innovative teaching methods revealed 10 possible challenges that may hinder the adoption of innovative teaching method, they include: managing active, student-centered methods like group work or projects can be difficult with very large classes, many institutions may lack the necessary tools like computers, internet access, VR equipment, or drones, lecturers themselves may not have been trained in using innovative methods or modern educational technologies, some lecturers and even students might prefer traditional

teaching methods and be reluctant to adopt new approaches, Preparing innovative lessons often requires more time for planning, coordinating, and assessment compared to lectures, strict or outdated curricula may limit the flexibility needed to implement innovative teaching strategies, challenges like unreliable electricity, poor classroom facilities, and lack of transportation for field activities can hinder innovative teaching. The findings of the study is in consonance with Obijiofor, and Obumneke-Okeke, (2020) who found out that some lecturers and even students might prefer traditional teaching methods and be reluctant to adopt new approaches. More so, the author noted that preparing innovative lessons often requires more time for planning, coordinating, and assessment compared to lectures. Ademama, (2018) also supported the findings of this study, pointing out that lack of instructional materials may hinder the effective application of some innovative teaching methods.

Findings on the opportunities for exploring the innovative teaching methods by agricultural education lecturers indicated 10 areas that could be explored to boost the innovative teaching methods, some of them are collaborating with agribusinesses and farms can provide access to real-world case studies, internships, and field trip opportunities, many national and international organizations offer grants for education innovation and sustainable agriculture projects, lecturers can attend training sessions, webinars, and certification programs focused on new teaching technologies and methods, free online materials, virtual labs, and agricultural simulations are available to supplement innovative teaching at low cost, smartphones, agricultural apps, and e-learning platforms can be leveraged even in resource-limited settings, partnering with agricultural

research centers can provide cutting-edge content and practical research experiences for students and Working with local farming communities provides a living lab for applying sustainable agricultural practices and social learning. The findings of the study is in line with Ajala, (2019) who observed that ameliorating the challenge of innovative teaching methods will require training and retraining of the teachers who are to use this method to teach the students. Naresh, (2017) supported the findings of this study pointing out that in exploring the innovative teaching methods by agricultural education lecturers, there is need for collaboration with agribusinesses and farms can provide access to real-world case studies, internships, and field trip opportunities, many national and international organizations offer grants for education innovation and sustainable agriculture projects,

Conclusion

The adoption of innovative teaching methods has the potential to greatly enhance the quality of agricultural education in Enugu State, thereby promoting sustainable agricultural practices. By incorporating practical, hands-on learning experiences into the curriculum, students will be better equipped to face modern agricultural challenges and contribute to a sustainable future. However, for these improvements to be fully realized, institutions must address existing challenges such as limited resources and insufficient faculty training. The study suggests that a strategic shift toward interactive and experiential teaching methods, supported by adequate funding and policy reform, is essential for improving agricultural education and fostering sustainability.

Recommendations

Based on the study's findings, the following recommendations are proposed:

1. Partnerships between the government and private sector should focus on enhancing infrastructure and resources in agricultural education institutions.

2. Regular workshops and training on innovative teaching methods and sustainable agricultural practices should be implemented.

3. Institutions should incorporate more fieldwork, project-based assignments, and digital learning tools to promote deeper learning and practical application.

4. The curriculum should be regularly revised to reflect global trends and evolving demands in sustainable agriculture.

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