

## **THE ROLE OF AGRICULTURAL EDUCATION IN PROMOTING SUSTAINABLE FARMING PRACTICES AMONG RURAL YOUTHS IN MAKURDI LOCAL GOVERNMENT AREA OF BENUE STATE, NIGERIA**

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### **ABSTRACT**

*This study investigated the role of agricultural education in promoting sustainable farming practices among rural youths in Makurdi Local Government Area (LGA) of Benue State, Nigeria. Given escalating concerns about environmental degradation and food insecurity, promoting sustainable agricultural practices is increasingly critical, particularly in rural communities where agriculture constitutes the primary livelihood. The study aimed to: assess the extent to which agricultural education enhances awareness of sustainable farming techniques; evaluate the influence of such education on youths' adoption of sustainable practices; and identify challenges confronting the implementation of agricultural education programmes. A descriptive survey research design was adopted. The target population comprised 178 rural youths who were active members of Young Farmers' Clubs in selected schools and communities in Makurdi LGA. A census approach was employed, and data were collected using a structured, validated questionnaire consisting of 32 closed-ended items on a 4-point Likert scale. Content validity was established through expert review, and internal consistency was confirmed by a Cronbach's alpha coefficient of 0.81. Data were analysed using mean scores and standard deviations, with a benchmark mean of 2.50 for item acceptance. Findings revealed that agricultural education significantly enhances students' awareness of sustainable practices — including crop rotation, organic farming, soil conservation, and integrated pest management — and positively influences their environmental values and farming behaviour. The study concludes that integrating practical and theory-based agricultural education is vital in shaping environmentally responsible future farmers. Key recommendations include increased government funding, curriculum modernisation, and the expansion of community-based agricultural extension programmes.*

**Keywords:** *agricultural education, sustainable farming practices, rural youths, environmental conservation, Makurdi, Benue State*

## INTRODUCTION

Agricultural education occupies a central position in equipping young people — especially those in rural communities — with the knowledge, skills, and values essential for sustainable development. Osinem (2008) defines agricultural education as the process of imparting knowledge, skills, and attitudes in agriculture to learners to improve their productive capacities, self-reliance, and contributions to national development. Complementarily, Ijaiya (1998) conceptualises it as an educational process that prepares individuals for entry into and advancement within agriculture, food, and natural resource systems. Together, these definitions underscore the dual function of agricultural education: fostering productivity and nurturing responsible environmental stewardship.

In Nigeria, agriculture remains a foundational pillar of the economy, providing employment for over 70% of the rural population (National Bureau of Statistics [NBS], 2021). Despite this significance, rural agriculture continues to face profound sustainability challenges, including poor farming practices, land degradation, overreliance on chemical inputs, and inadequate adoption of modern techniques. These challenges are particularly acute among rural youths, who represent both the present labour force and the future custodians of agricultural resources.

Sustainable agriculture seeks to meet current food and economic needs while preserving environmental resources for future generations. Core practices include crop rotation, organic farming, soil conservation, agroforestry, and efficient water management (FAO, 2019). For these practices to gain traction among rural youths, relevant education and training are indispensable. When embedded in secondary school curricula and complemented by community-based initiatives, agricultural education can meaningfully influence youths' attitudes and behaviours towards sustainable farming. Okorie and Ezeji (2020) affirm that the integration of sustainability-focused content in agricultural education has the potential to transform farming into a profitable and ecologically responsible vocation among Nigerian youths.

Agricultural education also addresses specific sub-sectors of sustainability. With respect to livestock production, Njoku and Nworgu (2019) observe that well-taught agricultural education improves farmers' knowledge of environmentally responsible animal husbandry — including proper waste management, composting, and biogas production — thereby reducing methane emissions and preventing soil and water contamination. In the domain of pasture management, Iheanacho and Obinne (2018) note that learners trained in rotational grazing and balanced feed formulation are better positioned to prevent overgrazing and land degradation. Climate-smart husbandry practices — including improved animal genetics, herd optimisation, and emissions monitoring — are similarly transmitted through structured agricultural education (FAO, 2020; World Bank, 2021).

In rural communities such as those in Makurdi LGA of Benue State, agricultural education serves not only as a tool for skills acquisition but also as a platform for environmental awareness. FAO (2017) emphasises that educating youth in sustainable agriculture is essential to ensuring food security, preserving ecosystems, and reducing rural poverty. By equipping youths with knowledge of soil conservation, crop rotation, organic farming, and climate-smart agriculture, agricultural education can transform them into active agents of sustainable rural development. This study is therefore motivated by the need to systematically assess the extent to which agricultural education fulfils this transformative role in the Makurdi context.

Despite growing global and national concern about environmental degradation and unsustainable farming practices, many rural youths in Makurdi LGA continue to engage in conventional, environmentally harmful agricultural methods. The consequences are evident in declining soil fertility, reduced crop yields, and heightened vulnerability to the adverse effects of climate change. A principal contributing factor is the inadequacy of education and awareness concerning sustainable farming techniques. While the Nigerian educational system incorporates agricultural science into its secondary school curriculum, the emphasis on sustainability principles is often insufficient or poorly implemented (Iheanacho & Obinne, 2018). Furthermore, the informal agricultural sector rarely offers structured training for young people on environmentally sound practices.

As a result, the potential of agricultural education to catalyse sustainable farming among rural youths remains largely unrealised. This study, therefore, seeks to assess the role of agricultural education in promoting sustainable farming practices among rural youths in Makurdi LGA, to determine the extent of its current contribution, and to identify the constraints that must be addressed to strengthen its impact.

The specific objectives of this study were to:

- (i) Examine the extent to which agricultural education promotes awareness of sustainable farming techniques among rural youths in Makurdi LGA;
- (ii) Assess the influence of agricultural education on the adoption of sustainable farming practices among rural youths; and
- (iii) Identify the challenges confronting the implementation of agricultural education programmes aimed at promoting sustainability in rural farming.

The following research questions guided the study:

RQ1: To what extent has agricultural education increased awareness of sustainable farming practices among rural youths in Makurdi LGA?

RQ2: How has agricultural education influenced the adoption of sustainable farming practices among rural youths?

RQ3: What are the major challenges hindering the effectiveness of agricultural education in promoting sustainability in rural agriculture?

## METHODOLOGY

The study adopted a descriptive survey research design, which is appropriate for collecting and analysing data from a defined population to determine the influence of educational programmes on behaviour and attitudes in naturalistic settings.

The study was conducted in Makurdi Local Government Area of Benue State, Nigeria. Makurdi, the state capital, hosts a considerable population of young farmers engaged in diverse agricultural activities. The area is particularly suitable for this study, given the presence of Young Farmers' Clubs in secondary schools and agricultural training centres across the LGA.

The population comprised 178 rural youths who were active members of Young Farmers' Clubs in selected schools and communities in Makurdi LGA. Given the manageable population size, a total census approach was adopted, meaning all 178 respondents were included in the study. This approach maximises representativeness and eliminates sampling error.

Data were collected using a structured questionnaire developed by the researchers. The instrument comprised 32 closed-ended items distributed across two sections: Section A captured respondents' demographic characteristics, while Section B contained items measuring awareness, adoption, and perceived challenges relating to sustainable farming practices. Items were rated on a 4-point Likert scale: Strongly Agree (4), Agree (3), Disagree (2), and Strongly Disagree (1).

Content validity was established through review by three subject-matter experts — one each in Agricultural Education, Educational Measurement and Evaluation, and Environmental Science at Benue State University. Their comments and suggested revisions were incorporated before administration. Reliability was assessed using Cronbach's alpha, which yielded a coefficient of 0.81, indicating high internal consistency and the instrument's suitability for data collection.

The researchers, assisted by trained research assistants, personally administered the questionnaires to respondents. Instructions were clearly explained, and questionnaires were retrieved immediately upon completion to minimise data loss. Data were analysed using descriptive statistics — specifically mean scores and standard deviations. The decision rule for item acceptance was a mean score of 2.50 or above; items with mean scores below this threshold were considered not accepted.

## RESULTS

### Research Question 1: Awareness of Sustainable Farming Practices

To what extent has agricultural education increased awareness of sustainable farming practices among rural youths in Makurdi LGA?

*Table 1. Mean scores and standard deviations for items on awareness of sustainable farming practices (n = 178)*

<b>S/N</b>	<b>Item Statement</b>	<b>Mean</b>	<b>SD</b>	<b>Remark</b>
1	Agricultural education has helped me understand the importance of protecting natural resources in farming.	3.21	0.73	Accepted
2	I have learned about environmentally friendly farming techniques such as crop rotation and organic fertilization through agricultural education.	2.65	0.87	Accepted
3	Agricultural education has increased my awareness of the negative effects of chemical misuse on soil and water.	3.06	0.94	Accepted
4	Through agricultural science in school or training programmes, I now know the benefits of using compost and manure instead of synthetic fertilizers.	2.87	0.89	Accepted
5	I am more aware of sustainable land management practices such as agroforestry and contour farming because of agricultural education.	2.67	0.99	Accepted
6	Agricultural education has exposed me to climate-smart farming methods that reduce environmental impact.	3.13	0.86	Accepted
7	I have gained knowledge on proper waste management in animal and crop production through agricultural education.	3.09	0.92	Accepted
8	Agricultural education has made me more conscious of conserving water and using irrigation techniques that prevent wastage.	3.12	0.80	Accepted

*Source: Field Survey, 2024*

As presented in Table 1, all eight items recorded mean scores above the benchmark of 2.50, ranging from 2.65 to 3.21. These results indicate that agricultural education has significantly increased rural youths' awareness of sustainable farming practices in Makurdi LGA. The highest mean score (3.21) was recorded for Item 1, which pertains to understanding the importance of natural resource conservation, while the lowest (2.65) relates to awareness of agroforestry and contour farming — suggesting that more complex land management concepts require greater curricular emphasis. Overall, the findings affirm that agricultural training and school curricula are effective conduits for promoting awareness of environmentally responsible farming.

## Research Question 2: Adoption of Sustainable Farming Practices

How has agricultural education influenced the adoption of sustainable farming practices among rural youths?

*Table 2. Mean scores and standard deviations for items on adoption of sustainable farming practices (n = 178)*

S/N	Item Statement	Mean	SD	Remark
1	I now use integrated pest management (IPM) techniques in my farming activities due to agricultural training.	3.72	0.98	Accepted
2	Agricultural education has motivated me to reduce the use of synthetic pesticides on my crops.	2.55	1.01	Accepted
3	I apply organic manure (e.g., compost, animal waste) instead of chemical fertilizers after attending agricultural lessons.	2.66	0.99	Accepted
4	I practise crop rotation on my farm as a result of knowledge gained through agricultural education.	3.87	0.95	Accepted
5	I avoid bush burning and instead apply mulching and cover cropping to conserve soil, based on what I was taught.	3.67	0.99	Accepted
6	I have adopted proper animal waste disposal methods such as composting due to agricultural education.	3.08	1.02	Accepted
7	Agricultural education has helped me practise water-saving techniques such as drip or manual irrigation.	3.17	0.95	Accepted
8	Agricultural education has influenced me to raise fewer but more productive livestock to reduce land pressure.	2.92	0.98	Accepted
9	I keep records of farm inputs and outputs to monitor environmental and economic performance as taught in agricultural classes.	2.85	0.93	Accepted

10	I prefer using local and improved seeds over genetically modified ones due to training on sustainable practices.	3.02	0.97	Accepted
11	I have integrated trees (agroforestry) into my farming system after learning about their environmental benefits.	2.96	0.95	Accepted
12	I now manage my farmland to reduce erosion through techniques such as contour ploughing and terracing.	3.10	0.98	Accepted
13	I recycle crop residues as mulch or animal feed based on what I learned through agricultural education.	3.83	0.97	Accepted
14	I store and treat water for farming purposes to reduce wastage, based on knowledge from agricultural lessons.	3.19	0.89	Accepted
15	I encourage fellow youths to adopt sustainable practices I learned through agricultural education.	2.79	0.99	Accepted

*Source: Field Survey, 2024*

Table 2 reveals that all 15 items exceeded the benchmark mean of 2.50, with scores ranging from 2.55 to 3.87. These findings demonstrate that agricultural education has positively influenced the adoption of a broad range of sustainable farming practices. The highest mean scores were recorded for crop rotation (3.87), recycling crop residues as mulch or animal feed (3.83), integrated pest management (3.72), and avoidance of bush burning in favour of mulching (3.67). These results suggest strong behavioural change in areas that are relatively accessible and familiar. Practices involving greater technical or resource demands — such as reducing synthetic pesticide use (2.55) and applying organic manure (2.66) — recorded comparatively lower, though still accepted, mean scores, indicating areas where further reinforcement is warranted. The findings are consistent with Adebayo and Oladele (2020), who demonstrated that well-structured agricultural education programmes catalyse the adoption of modern and sustainable farming techniques among young farmers.

### **Research Question 3: Challenges to Effective Implementation**

What are the major challenges hindering the effectiveness of agricultural education in promoting sustainability in rural agriculture?

*Table 3. Mean scores and standard deviations for items on challenges to agricultural education implementation (n = 178)*

<b>S/N</b>	<b>Item Statement</b>	<b>Mean</b>	<b>SD</b>	<b>Remark</b>
1	Government support for agricultural education in rural areas is limited or inconsistent.	2.77	0.87	Accepted
2	Poor infrastructure (e.g., water supply, electricity) affects hands-on agricultural training.	2.65	0.95	Accepted
3	Agricultural education programmes are not well integrated with community farming initiatives.	2.81	0.96	Accepted
4	Parents and community leaders often discourage farming, affecting youths' participation.	3.27	0.85	Accepted
5	There is poor collaboration between schools and local agricultural extension officers.	3.17	0.87	Accepted
6	Agricultural education is mostly theoretical, with limited practical exposure for students.	2.91	1.00	Accepted
7	There are insufficient qualified agricultural science teachers in rural schools.	2.74	0.86	Accepted
8	Agricultural science is not given sufficient emphasis compared to other school subjects.	3.92	0.98	Accepted
9	Lack of access to demonstration farms or school gardens hinders practical learning.	2.73	0.93	Accepted
10	Youths are often not motivated to take agriculture seriously as a career pathway.	2.93	0.88	Accepted
11	Most schools lack adequate funding and resources for agricultural equipment and materials.	3.21	0.85	Accepted
12	Outdated curriculum content does not address modern sustainable farming techniques.	2.99	0.89	Accepted
13	Inadequate follow-up or monitoring of students' practical agricultural projects reduces effectiveness.	2.72	0.85	Accepted

14	Inadequate awareness of climate-smart agriculture limits the sustainability impact of agricultural education.	2.98	0.93	Accepted
15	Cultural beliefs and land ownership issues discourage youths from applying what they learn.	3.19	0.89	Accepted

*Source: Field Survey, 2024*

Table 3 shows that all 15 challenge items were accepted, with mean scores ranging from 2.65 to 3.92. The highest mean (3.92) was recorded for Item 8 — the marginalisation of agricultural science relative to other school subjects — indicating that structural deprioritisation of the discipline is the most pressing systemic constraint. Other prominently scored challenges included parental and community discouragement of farming careers (3.27), cultural beliefs and land ownership barriers (3.19), poor school–extension service collaboration (3.17), and inadequate school funding for equipment and materials (3.21). The relatively lower scores for infrastructure deficits (2.65) and inadequate monitoring of student projects (2.72) nonetheless indicate that these too constitute recognised impediments. Collectively, the findings corroborate FAO (2019) and Njoku and Nworgu (2019), who contend that agricultural education cannot effectively drive sustainability without adequate institutional support, modernised curriculum, and active stakeholder collaboration.

## **DISCUSSION**

The findings of this study demonstrate that agricultural education plays a substantive role in promoting sustainable farming practices among rural youths in Makurdi LGA. With respect to awareness, all items in Table 1 were accepted, confirming that exposure to agricultural curricula and training programmes translates into meaningful knowledge gains about natural resource conservation, organic farming, climate-smart agriculture, and environmentally responsible water and pest management. This outcome aligns with Iheanacho and Obinne (2018), who established that agricultural education fosters environmental awareness and encourages sustainable behaviour among learners.

With respect to adoption, the mean scores in Table 2 reflect considerable behavioural change. Practices such as crop rotation, recycling of crop residues, integrated pest management, and agroforestry integration recorded particularly high means, indicating that these sustainability techniques have been internalised and applied by respondents. This finding supports Adebayo and Oladele (2020), who reported that structured agricultural education programmes are effective in promoting the uptake of modern sustainable farming practices. The comparatively lower means for pesticide reduction and organic manure application suggest that while awareness is high, the transition from conventional to more demanding sustainable practices may require supplementary technical support and incentives. Notwithstanding these gains, Table 3 reveals that the full potential of agricultural education is constrained by a range of systemic, infrastructural, and socio-cultural factors.

The pronounced marginalisation of agricultural science in the school curriculum — reflected in the highest challenge mean of 3.92 — represents a fundamental structural problem that undermines both teacher motivation and student engagement.

Weak linkages between schools and agricultural extension services, insufficient qualified teachers, outdated curricula, and inadequate practical facilities further compound the problem. These findings resonate with Okebukola (2015) and FAO (2019), who have identified curriculum inadequacy and weak institutional frameworks as persistent obstacles to effective agricultural education in Nigeria. The socio-cultural dimension — particularly community discouragement and cultural beliefs about land ownership — underscores the need for community sensitisation alongside formal educational interventions.

## CONCLUSION

This study provides empirical evidence that agricultural education is a significant driver of both awareness and adoption of sustainable farming practices among rural youths in Makurdi LGA. Students and young farmers who have received agricultural education demonstrate greater knowledge of soil conservation, organic farming, integrated pest management, and climate-smart techniques, and are more likely to apply these practices on their farms. However, the study equally highlights that the effectiveness of agricultural education is considerably constrained by structural deficiencies, including curriculum marginalisation, inadequate infrastructure, teacher shortages, and socio-cultural barriers.

To fully realise the transformative potential of agricultural education in driving sustainable rural development, a concerted, multi-stakeholder response is necessary. Agricultural science must be repositioned as a priority discipline within the national school curriculum, supported by adequate funding, modernised content, and robust practical training facilities. School–extension service linkages must be strengthened, and community engagement strategies must be developed to shift cultural attitudes towards farming as a dignified and ecologically responsible career.

## RECOMMENDATIONS

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

- (i) The government at the federal and state levels should increase budgetary allocations to agricultural education, ensuring that schools have adequate equipment, demonstration farms, and qualified teachers.
- (ii) The Nigerian Educational Research and Development Council (NERDC) should urgently review and update the agricultural science curriculum to incorporate climate-smart agriculture, agroecology, and contemporary sustainability principles.
- (iii) Agricultural Development Programmes (ADPs) and extension services should establish formal collaboration frameworks with secondary schools and youth farmer clubs to bridge the gap between classroom instruction and field practice.

- (iv) Community-based sensitisation programmes should be designed to engage parents, community leaders, and traditional authorities in reorienting cultural attitudes towards farming as a viable and environmentally responsible livelihood.
- (v) Future research should employ experimental or longitudinal designs to establish causal relationships between specific agricultural education interventions and long-term behavioural change in sustainable farming.

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