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Impact of Agricultural Science Education on Youth Engagement in Agribusiness in Northeast Nigeria

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Abstract

This study investigates the impact of Agricultural Science education on youth engagement in agribusiness in Northeast Nigeria, focusing on its role in fostering entrepreneurial skills, enhancing practical training, and addressing challenges that hinder youth participation in agribusiness ventures. The research employed a questionnaire administered to 704 respondents, including 320 students and 384 youths, to assess the effectiveness of Agricultural Science education in preparing youth for agribusiness. The findings reveal that Agricultural Science education significantly contributes to the development of key entrepreneurial skills, equips students with essential knowledge, and cultivates an entrepreneurial mindset, encouraging youth to pursue agribusiness ventures. Despite these positive outcomes, challenges such as limited access to financial resources, inadequate infrastructure, and insufficient exposure to modern farming technologies impede youth engagement in agribusiness. The

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study also found that integrating modern agribusiness practices into the curriculum enhances students' readiness to engage in agribusiness ventures. The study recommends improving hands-on training, incorporating modern agricultural technologies into the curriculum, increasing government support for agripreneurs, and fostering public-private partnerships to address the identified challenges. This research underscores the critical role of Agricultural Science education in promoting youth participation in agribusiness and its potential to contribute to the economic development of Northeast Nigeria.

Keywords: Agricultural Science Education, Youth Engagement, Agribusiness, Entrepreneurial Skills, Modern Farming Technologies, Northeast Nigeria

INTRODUCTION

Agricultural Science education is crucial in shaping the future of agriculture, particularly in regions where farming is a primary occupation and a source of livelihood. In Northeast Nigeria, agriculture remains the backbone of the economy, employing a significant portion of the population and contributing to food security. However, despite the central role of agriculture, the region faces numerous challenges, including poverty, unemployment, and limited access to modern agricultural practices and technologies. This has heightened the importance of agricultural education as a means of addressing these issues by equipping youth with the knowledge and skills necessary to engage in agribusiness and other agriculture-related ventures.

Agricultural Science education encompasses a broad range of subjects that equip students with the scientific knowledge and practical skills required to effectively engage in various aspects of farming, from crop production to livestock management, and post-harvest processing. It also introduces students to emerging agricultural technologies, entrepreneurial skills, and business management practices that are essential for success in modern agribusiness. Youth involvement in agribusiness offers significant potential not only for addressing the region's unemployment problem but also for boosting local economies, ensuring food security, and improving the livelihoods of families.

In recent years, there has been a growing recognition of the need for a shift towards more inclusive, market-oriented, and sustainable agricultural practices, especially among the youth. This shift is particularly important in Northeast Nigeria, where young people are increasingly seeking employment opportunities outside of traditional farming practices. As a result, there has been a growing emphasis on the role of Agricultural Science education in fostering youth engagement in agribusiness, which could lead to the development of more sustainable farming systems and the promotion of rural development.

Despite its potential, however, the extent to which Agricultural Science education has impacted youth engagement in agribusiness in Northeast Nigeria remains an under-researched area. There is a gap in understanding how the content of Agricultural Science education aligns with the entrepreneurial needs of young people, the challenges they face in establishing agribusiness ventures, and the effectiveness of educational policies and programs in addressing these challenges. Given the critical role of youth in the future of agriculture, it is essential to explore the relationship between Agricultural Science education and youth engagement in agribusiness in Northeast Nigeria.

The Context of Agriculture and Agribusiness in Northeast Nigeria

Northeast Nigeria is home to some of the most agriculturally productive regions in the country, yet it remains economically underdeveloped. Agriculture in the region is predominantly small-scale and traditional, with most farmers relying on subsistence farming. This is despite the enormous agricultural potential, which includes vast arable land, favorable climatic conditions, and diverse ecosystems that support the cultivation of crops like maize, sorghum, millet, and groundnut, as well as the rearing of livestock such as cattle, sheep, and goats (Oni & Akinyemi, 2019).

The youth population in Northeast Nigeria faces significant socio-economic challenges. Unemployment rates among young people in the region are high, and many are engaged in informal, low-income jobs or are entirely unemployed. The lack of job opportunities and the decline in traditional farming practices have contributed to increased rural-urban migration, which has further strained urban centers. As such, youth engagement in agribusiness presents a promising opportunity for economic empowerment, job creation, and poverty reduction in the region.

In response to these challenges, policymakers have recognized the need for a more dynamic agricultural sector, one that goes beyond traditional farming methods and integrates agribusiness practices that can create value chains, enhance productivity, and generate employment. This transformation is expected to be driven in part by the youth, who, when equipped with the right skills and knowledge, can contribute significantly to the development of agribusiness in the region.

Agricultural Science Education and Youth Engagement in Agribusiness

Agricultural Science education has evolved over the years to reflect the changing needs of the agricultural sector. The curriculum now includes not only traditional farming techniques but also focuses on modern technologies, sustainable agricultural practices, and business skills. This shift is designed to prepare students for the realities of agribusiness, which require not only technical knowledge but also the ability to manage agricultural enterprises and engage in value-added activities such as processing, marketing, and distribution (Adeola, 2022).

Youth engagement in agribusiness is influenced by a combination of factors, including the quality of education they receive, the availability of resources, and their entrepreneurial mindset. In the case of Agricultural Science education, the extent to which the curriculum integrates business skills, practical experiences, and access to resources can determine how well-equipped young people are to pursue agribusiness ventures. For instance, programs that emphasize hands-on training in areas such as farm management, marketing, and financial planning can better prepare students for the realities of running an agricultural enterprise (Ogunleye, 2020).

Moreover, the impact of Agricultural Science education on youth engagement in agribusiness is also shaped by the policies and frameworks in place to support young entrepreneurs. Government programs, such as the National Youth Agro-entrepreneurship Development Programme and the Agricultural Transformation Agenda, have been established to promote agribusiness among youth, offering financial support, training, and mentorship. However, the success of these initiatives depends on how well they are implemented and how accessible they are to youth in Northeast Nigeria, where access to educational and financial resources can be limited (Adebayo & Oluwaseun, 2023).

Despite the availability of various educational programs and government initiatives, several barriers hinder the effective engagement of youth in agribusiness. These challenges

include inadequate infrastructure, limited access to credit, market instability, and the reluctance of young people to pursue agriculture as a career due to perceived low returns and a lack of opportunities for upward mobility. Additionally, the curriculum in some agricultural education institutions may not fully align with the practical needs of agribusiness, leaving graduates ill-prepared to navigate the complex agricultural value chains (Ekong, 2023). This study aims to examine the impact of Agricultural Science education on youth engagement in agribusiness in Northeast Nigeria.

Research Problem and Significance

The problem addressed by this study is the limited understanding of the role that Agricultural Science education plays in encouraging youth to engage in agribusiness in Northeast Nigeria. While there are various educational and policy initiatives aimed at fostering youth participation in agribusiness, there is insufficient empirical research on the effectiveness of these programs and the factors that influence youth engagement in agribusiness ventures.

This study is significant because it will provide valuable insights into how Agricultural Science education can be leveraged to address the challenges of unemployment and underdevelopment in Northeast Nigeria. By examining the impact of educational policies, curriculum design, and training programs on youth engagement in agribusiness, the study will contribute to the development of more effective strategies for integrating agribusiness into the educational system. Moreover, the findings will inform policymakers, educators, and development practitioners about the best approaches to enhancing the role of youth in the agricultural sector, ultimately fostering economic development and food security in the region.

Research Objectives

The objectives of this study are:

1. To assess the extent to which Agricultural Science education influences youth engagement in agribusiness in Northeast Nigeria.
2. To evaluate the effectiveness of the curriculum content and practical training programs in preparing students for agribusiness ventures.
3. To identify the challenges faced by youth in establishing and sustaining agribusiness ventures in the region.

4. To recommend strategies for improving Agricultural Science education to enhance youth participation in agribusiness.

Research Questions

1. To what extent does Agricultural Science education influence youth engagement in agribusiness in Northeast Nigeria?
2. How effective is the curriculum content and practical training in Agricultural Science education in preparing students for agribusiness ventures?
3. What are the challenges faced by youth in establishing and sustaining agribusiness ventures in Northeast Nigeria?
4. What strategies can be implemented to improve Agricultural Science education to enhance youth participation in agribusiness in Northeast Nigeria?

METHODS

This study employed a descriptive survey research design to assess the impact of Agricultural Science education on youth engagement in agribusiness in Northeast Nigeria. A descriptive survey design is ideal for collecting data on existing conditions and occurrences, allowing for a thorough analysis of the phenomena without manipulating the study variables (Adamu, 2015). The study was conducted in Northeast geopolitical zone of Nigeria, which includes Adamawa, Bauchi, Borno, Gombe, Taraba, and Yobe. The target population consisted of students enrolled in Agricultural Science programs at government-owned universities and polytechnics, as well as youth actively engaged in agribusiness within the region.

The total population for the study was 99,933 individuals comprising of 1930 Agricultural Science students and 98,003 youth entrepreneurs involved in agribusiness, distributed across five educational institutions and agribusiness hubs in the Northeast. The sample size of the study was determined using Krejche and Morgan 1970 sample size table. The sample size for the study is 704 respondents with 320 Agricultural Science students and 384 youth entrepreneurs involved in agribusiness, distributed across five educational institutions and agribusiness hubs in the Northeast. This approach was deemed appropriate to ensure comprehensive data collection and to enhance the generalizability of the findings.

Data were collected using a researcher-designed questionnaire titled **"Agricultural Science Education and Agribusiness Engagement Questionnaire (ASEAEQ)."** The instrument consisted of 40 items divided into four clusters: (1) the impact of Agricultural Science education on youth engagement in agribusiness, (2) the effectiveness of curriculum content in preparing students for agribusiness ventures, (3) the challenges faced by youth in establishing and sustaining agribusinesses, and (4) strategies to improve Agricultural Science education for better youth participation in agribusiness. The responses were measured using a four-point Likert scale: **Strongly Agreed (SA - 4), Agreed (A - 3), Disagreed (D - 2),** and **Strongly Disagreed (SD - 1).** Negatively worded items were reverse-scored to maintain consistency in responses. To ensure the validity of the instrument, it was reviewed by experts in Agricultural Education and Agribusiness from institutions within the Northeast region. A pilot study was conducted with 20 students and youth entrepreneurs from Gombe State, and the reliability of the questionnaire was tested using Cronbach's Alpha, which yielded a coefficient of 0.87, indicating good internal consistency and reliability.

The data collection process involved administering the questionnaire to all 320 students and 384 youth entrepreneurs. The researcher, with the assistance of trained research assistants, personally distributed and collected the completed questionnaires using the "wait-and-take" method, ensuring a high response rate of 97%. This method helped to guarantee that the participants had adequate time to complete the survey and to clarify any ambiguities, leading to a total of 683 completed questionnaires.

The data were analyzed using descriptive statistics, including mean scores and standard deviations, to answer the research questions. A criterion mean score of 2.50 was used to determine the extent to which different factors influenced youth engagement in agribusiness.

RESULTS

Research Question 1: To what extent does Agricultural Science education influence youth engagement in agribusiness in Northeast Nigeria?

Table 1: Extent of Agricultural Science Education's Influence on Youth Engagement in Agribusiness in Northeast Nigeria

S/N	Questionnaire Items	Mean	SD	Remark
1	Agricultural Science education teaches skills that are essential for youth engagement in agribusiness.	3.80	0.49	Agreed
2	Students are encouraged to pursue agribusiness as a career after studying Agricultural Science.	3.75	0.51	Agreed
3	The knowledge gained from Agricultural Science education increases youth interest in agribusiness.	3.70	0.55	Agreed
4	Agricultural Science education promotes entrepreneurship among students.	3.65	0.58	Agreed
5	Students of Agricultural Science education are well-equipped to engage in agribusiness activities.	3.85	0.48	Agreed
6	Agricultural Science education contributes to practical skills that support youth agribusiness ventures.	3.75	0.51	Agreed
7	Agricultural Science education in schools provides sufficient resources to engage in agribusiness.	3.70	0.53	Agreed
8	Youths who have studied Agricultural Science are more likely to participate in agribusiness.	3.80	0.46	Agreed
9	Agricultural Science education helps youth understand the economic potential of agribusiness.	3.75	0.50	Agreed
10	Agricultural Science education offers opportunities to gain real-world experience in agribusiness.	3.85	0.47	Agreed
	Grand Mean	**3.75**	**0.52**	**Agreed**

The results from Table 1 indicate that Agricultural Science education strongly influences youth engagement in agribusiness in Northeast Nigeria. Respondents generally agreed that the education provides essential skills, promotes entrepreneurship, increases interest in agribusiness, and equips students with practical skills. With a grand mean of 3.75 and a low standard deviation range, the results suggest a high level of consensus that Agricultural Science education plays a key role in preparing youth for agribusiness. These outcomes highlight the importance of Agricultural Science in fostering youth involvement in the sector.

Research Question 2: How effective is the curriculum content and practical training in Agricultural Science education in preparing students for agribusiness ventures?

Table 2: Effectiveness of Curriculum Content and Practical Training in Agricultural Science Education in Preparing Students for Agribusiness Ventures

S/N	Questionnaire Items	Mean	SD	Remark
1	The Agricultural Science curriculum includes sufficient business concepts for agribusiness ventures.	3.60	0.55	Agreed
2	The curriculum provides practical skills that are directly applicable to starting agribusiness ventures.	3.70	0.50	Agreed
3	There is a strong focus on entrepreneurial skills in the Agricultural Science curriculum.	3.65	0.52	Agreed
4	Practical training opportunities in Agricultural Science effectively prepare students for agribusiness.	3.75	0.49	Agreed
5	The curriculum includes exposure to modern agribusiness practices.	3.80	0.47	Agreed
6	Students are trained in both theory and practical aspects of agribusiness management.	3.70	0.54	Agreed
7	The curriculum helps students understand the challenges and opportunities in agribusiness.	3.60	0.56	Agreed
8	There is adequate emphasis on the importance of technology in agribusiness within the curriculum.	3.65	0.53	Agreed
9	The Agricultural Science curriculum allows students to practice entrepreneurship during their studies.	3.80	0.48	Agreed
10	Students are adequately prepared for agribusiness ventures through hands-on learning and fieldwork.	3.75	0.51	Agreed
	Grand Mean	3.71	0.52	

Table 2 shows that the Agricultural Science curriculum and practical training are effective in preparing students for agribusiness ventures. With mean scores ranging from 3.60 to 3.80, respondents agreed that the curriculum provides essential business concepts, practical skills, and entrepreneurial focus. Key items, such as exposure to modern agribusiness practices (mean = 3.80) and hands-on learning opportunities (mean = 3.75), were rated highly. The grand mean of 3.71, coupled with low standard deviations, indicates a strong consensus on the curriculum's effectiveness in preparing students for agribusiness ventures.

Research Question 3: What are the challenges faced by youth in establishing and sustaining agribusiness ventures in Northeast Nigeria?

Table 3: Challenges Faced by Youth in Establishing and Sustaining Agribusiness Ventures in Northeast Nigeria

S/N	Questionnaire Items	Mean	SD	Remark
1	Youth face difficulties in securing financial capital for agribusiness ventures.	3.90	0.43	Agreed
2	There is inadequate infrastructure to support youth agribusiness ventures.	3.85	0.45	Agreed
3	Youths face challenges in accessing land for agribusiness purposes.	3.75	0.48	Agreed
4	Market volatility and price fluctuations make it difficult for youth to sustain agribusiness ventures.	3.80	0.44	Agreed
5	Limited access to modern farming technologies hinders youth in agribusiness.	3.70	0.49	Agreed
6	There is a lack of government policies that support youth involvement in agribusiness.	3.85	0.47	Agreed
7	Poor transportation networks and logistics limit youth participation in agribusiness.	3.75	0.51	Agreed
8	Youths often lack the necessary skills and training to effectively manage agribusiness ventures.	3.60	0.55	Agreed
9	Youths face cultural and societal barriers that discourage them from starting agribusiness ventures.	3.70	0.52	Agreed
10	The unstable political climate in Northeast Nigeria affects the growth and sustainability of youth agribusiness ventures.	3.80	0.46	Agreed
	Grand Mean	**3.76**	**0.49**	**Agreed**

Table 3 highlights the challenges faced by youth in establishing and sustaining agribusiness ventures in Northeast Nigeria. The mean scores range from 3.60 to 3.90, indicating strong agreement with the identified challenges. Key issues such as securing financial capital (mean = 3.90), inadequate infrastructure (mean = 3.85), and market volatility (mean = 3.80) were identified as significant obstacles. The grand mean of 3.76, along with low standard deviations (ranging from 0.43 to 0.55), reflects a high level of consensus on the difficulties youth encounter in agribusiness. These challenges, particularly in financing, infrastructure, and market stability, significantly hinder youth participation in agribusiness ventures.

Research Question 4: What strategies can be implemented to improve Agricultural Science education to enhance youth participation in agribusiness in Northeast Nigeria?

Table 4: Strategies to Improve Agricultural Science Education to Enhance Youth Participation in Agribusiness

S/N	Questionnaire Items	Mean	SD	Remark
1	Agricultural Science education should include more practical, hands-on training in agribusiness.	3.80	0.48	Agreed
2	The curriculum should integrate modern agricultural technologies that are relevant to agribusiness.	3.75	0.51	Agreed
3	More government financial support should be directed towards youth agribusiness ventures.	3.90	0.45	Agreed
4	Institutions should offer specialized training on agribusiness management.	3.85	0.46	Agreed
5	More collaboration should occur between universities and agribusinesses to provide real-world learning opportunities.	3.75	0.52	Agreed
6	The curriculum should emphasize the importance of marketing and market access for agribusiness.	3.80	0.47	Agreed
7	There should be more entrepreneurial development programs integrated into Agricultural Science education.	3.85	0.45	Agreed
8	Government policies should focus on providing easy access to credit and loans for youth involved in agribusiness.	3.90	0.44	Agreed
9	Universities should offer mentorship programs that connect students with successful agripreneurs.	3.80	0.48	Agreed
10	Local and international partnerships should be established to enhance youth engagement in agribusiness.	3.85	0.47	Agreed
	Grand Mean	**3.82**	**0.48**	**Agreed**

Table 4 outlines strategies to improve Agricultural Science education to enhance youth participation in agribusiness in Northeast Nigeria. The mean scores, ranging from 3.75 to 3.90, reflect strong agreement with various proposed strategies. Key recommendations include increasing practical, hands-on training (mean = 3.80), integrating modern agricultural technologies (mean = 3.75), and improving government financial support (mean = 3.90) for youth agribusiness ventures. Additionally, respondents emphasized the importance of specialized training in agribusiness management, entrepreneurial development programs, and mentorship opportunities. The grand mean of 3.82, accompanied by low standard deviations, indicates a high level of consensus on the need for comprehensive reforms in Agricultural Science education to better prepare youth for successful agribusiness ventures.

DISCUSSION

The study underscored the pivotal role of Agricultural Science education in fostering youth participation in agribusiness. It found that respondents strongly believed that the knowledge and skills imparted through Agricultural Science education significantly contribute to youth engagement in agribusiness ventures. This aligns with the work of Johnson and Etim (2023), who emphasized the significance of vocational education that combines both theoretical knowledge and practical training. Johnson and Etim's research highlights how these aspects empower students to pursue entrepreneurial careers in agribusiness. Furthermore, integrating agribusiness principles and entrepreneurship into the curriculum has been shown to cultivate students' interest in agribusiness, making them more inclined to engage in it post-graduation (Ogunleye, 2020). This study's findings mirror this assertion, as the integration of business concepts and practical entrepreneurship training has been essential in developing an entrepreneurial mindset in students. The study also affirms the role of educational institutions as catalysts in preparing students for agribusiness careers, equipping them with the necessary tools to navigate the challenges and opportunities in the agricultural sector.

The study revealed that the content and practical training in Agricultural Science are generally effective in preparing students for agribusiness ventures. The combination of theoretical understanding and hands-on experience helps students gain comprehensive skills needed to thrive in agribusiness. This supports the findings of Nwankwo (2021), who emphasized the importance of blending classroom learning with practical skills to effectively nurture entrepreneurial capabilities in students. Additionally, the study highlighted the necessity of integrating modern agribusiness practices into the curriculum, further strengthening students' preparedness for the real-world business environment. This aligns with Adebayo (2022), who noted the growing demand for agricultural curricula to embrace technological advancements and contemporary agribusiness tools. Exposure to cutting-edge farming technologies and the development of entrepreneurial skills are fundamental to ensuring that graduates can effectively manage and sustain agribusiness ventures, a gap that the study suggests should be addressed within the curriculum.

The study identified key barriers that youth face when establishing and sustaining agribusiness ventures, including limited access to financial resources, poor infrastructure, and inadequate access to modern farming technologies. These challenges mirror the

findings of Ekong (2022), who cited financial constraints, infrastructure limitations, and the lack of access to modern technologies as significant obstacles hindering youth participation in agribusiness. The study also pointed out market volatility, fluctuating prices, and land access issues as critical impediments to the growth and sustainability of youth-led agribusinesses. These factors underscore the necessity for comprehensive policy interventions aimed at providing financial support, improving infrastructure, and ensuring access to modern farming tools. The study suggests that addressing these challenges will be key to enabling youth to successfully engage in agribusiness ventures.

To foster greater youth participation in agribusiness, the study proposed several strategies. Key recommendations included incorporating more practical, hands-on training, integrating modern agricultural technologies into the curriculum, and emphasizing entrepreneurial development. Respondents also suggested greater government support, especially in facilitating access to credit for youth in agribusiness, to mitigate financial barriers. These strategies are consistent with Adebayo (2022), who advocated for increased financial support for youth agripreneurs and highlighted the importance of collaboration between educational institutions and agribusinesses to provide real-world learning experiences. Mentorship programs and internships were also seen as vital in bridging the gap between academic learning and practical agribusiness experience. These findings align with Nwankwo (2021), who stressed the importance of mentorship and exposure to real-world industry practices in preparing students for successful careers in agribusiness. The study emphasizes the need for a collaborative approach involving the government, educational institutions, and private sector stakeholders to support youth in agribusiness.

CONCLUSION

This study has demonstrated the significant role of Agricultural Science education in preparing youth for successful engagement in agribusiness ventures in Northeast Nigeria. The findings revealed that both the curriculum content and practical training provided by Agricultural Science programs are effective in equipping students with the essential skills and knowledge required for agribusiness. The integration of modern agribusiness practices, entrepreneurial training, and exposure to contemporary technologies enhances students' readiness to engage in agribusiness. However, the study also highlighted several challenges faced by youth, such as limited access to financial capital, poor

infrastructure, and inadequate access to modern farming technologies, which hinder the growth and sustainability of their agribusiness ventures. To address these challenges, the study recommended strategies such as enhancing hands-on training, increasing government support, and fostering partnerships between educational institutions and agribusinesses to provide real-world learning experiences. Ultimately, by strengthening the Agricultural Science education system and addressing the challenges youth face, it is possible to significantly improve youth participation in agribusiness, thus contributing to the economic development of the region.

Recommendations

Based on the findings of the study, the following recommendations were made:

a. **Enhance Practical Training and Curriculum Integration:** Educational institutions should integrate more hands-on, real-world training in agribusiness into the Agricultural Science curriculum.
b. **Increase Government Support for Youth Agribusiness:** Governments should create more policies that provide financial support, such as access to credit, subsidies, and grants, to youth involved in agribusiness ventures.
c. **Promote Industry Collaboration and Mentorship Programs:** Universities and vocational institutions should establish stronger partnerships with agribusinesses to provide students with mentorship opportunities, internships, and real-world learning experiences.
d. **Focus on Modern Technologies and Innovations:** Agricultural Science education should focus on incorporating cutting-edge technologies such as precision farming, digital platforms for marketing and logistics, and sustainable farming practices.

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