



The Nexus between Agricultural Education Curriculum and Food Security in Nigeria: Challenges and Way Forward for Sustainable Practice

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Abstract. This essay investigates the connection between Nigerian food security and agricultural education curricula. The study explores the importance of incorporating agricultural education within the formal education system with an emphasis on Nigeria in order to address the urgent problems of food insecurity in the nation. It looks at how agricultural education can help people acquire the information, abilities, and mindset needed to increase agricultural output, support sustainable farming methods, and guarantee that every Nigerian has access to wholesome food. In addition to discussing policy implications and reform strategies aimed at strengthening the relationship between agricultural education and food security in Nigeria, the paper emphasises the significance of fostering innovation and entrepreneurship in the agricultural sector, promoting practical training and experiential learning, and aligning curriculum with industry needs. These strategies include investing in vocational and technical education, youth empowerment programmes, and agricultural extension services. The paper offers insights into how Nigeria might leverage the transformative potential of agricultural education to achieve food security, support rural development, and create a more resilient and sustainable food system by examining successful initiatives and best practices. Overall, the study emphasises how crucial agricultural education curricula are to tackling issues with food security and promoting agricultural growth in Nigeria.

Keywords: Agricultural Education, Food Security, Curriculum, Curriculum Integration, Sustainable Agriculture

1. Introduction

Nigeria, a nation blessed with abundant agricultural resources, is currently experiencing a paradigm shift in its agricultural education programme, which will profoundly affect the nation's capacity to achieve sustainable food security (Srivastava, 2020). Because this relationship addresses not just the urgent need to address nutritional needs but also the more general concerns of social justice, economic growth, and environmental sustainability, its significance cannot be overstated (Jordan et al., 2023). This study investigates the intricate connection between agricultural education curricula and Nigeria's food security in light of this. It examines how educational frameworks influence agricultural practices, what barriers prevent them from succeeding, and how to make this crucial connection stronger. This study analyses the current state of affairs, carefully considers empirical evidence, and draws lessons from other nations in an effort to shed light on the subtleties of this symbiotic connection and offer guidance for Nigeria's future. This essay is more than simply a thought exercise; it is a forceful call to action for communities, farmers, educators, and legislators to collaborate in building a solid framework that safeguards the nation's food sovereignty, gives people more power, and boosts productivity. The interaction between Nigeria's agricultural education curriculum and food security is one of the most significant intersections where policy, education, and agricultural practices come together to address one of the most pressing issues of our time. The subject matter at hand pertains to the intricate relationship between the knowledge imparted in educational institutions and the practical applications of that knowledge in the agricultural sector. This relationship ultimately

impacts the nation's ability to ensure a reliable, easily accessible, and healthful food supply for its populace.

In Nigeria, a country rich in agricultural resources and fast growing in population, achieving food security is not just a fantasy but a pressing requirement. But there are still a lot of barriers to overcome before this goal can be accomplished, including inefficient farming practices, inadequate infrastructure, limited access to resources, and a lack of skilled agricultural labourers (Babasanya et al., 2013). Despite these challenges, agricultural education is essential to revolutionising the sector because it equips stakeholders with the skills, knowledge, and innovative problem-solving strategies needed to overcome obstacles and increase productivity (Fernando, 2020).

The agricultural education curriculum raises and imparts critical knowledge and best practices to a new generation of farmers, agribusiness specialists, and legislators. Results related to food security are directly influenced by how well it can adapt to the shifting needs of the agriculture industry. This covers things like animal output, crop yields, market accessibility, and resilience to environmental shocks (Payumo et al., 2017).

However, there are various challenges and uncertainties in the connection between agricultural education and food security. It is challenging to carry out educational efforts intended to increase food security because of a variety of problems, including out-of-date curricula, institutional barriers, resource constraints, and restricted access to education in rural regions (Calixte et al., 2019). In addition, the rapidly evolving agricultural landscape is a consequence of consumer preferences, technology advancements, and climate change—all of which necessitate continuous innovation and adaptation within educational frameworks.

2. Importance of Agricultural Education Curriculum:

The curriculum for agricultural education is very important because it may be used as a catalyst to drive radical change in the agricultural industry. This can have a significant impact on how food security develops in Nigeria. Several significant elements highlight its significance:

Capacity Building: Agricultural education courses serve as the cornerstone for the skill development of those engaged in various aspects of the agricultural value chain, including farmers, extension agents, agribusiness specialists, and lawmakers. The

programme equips stakeholders with the necessary knowledge, practical skills, and innovative approaches to address emerging concerns, enhance productivity, and adopt sustainable farming practices (Camillone et al., 2020).

Knowledge Transfer and Innovation: Research institutes with robust agricultural education curricula are better able to communicate information and technological innovations to farming communities. By staying up to date with the newest developments in agronomy, livestock management, agribusiness, and agricultural engineering, students and practitioners may leverage new insights and technologies to boost agricultural productivity, resilience, and profitability.

Promotion of Sustainable Practices: The promotion of sustainable farming practices that lessen environmental harm, protect natural resources, and increase ecosystem resilience depends on agricultural education curricula. The next generation of farmers is cultivated in schools through the integration of integrated pest control, soil conservation, agroecology, and water management into the curriculum (Schröder et al., 2019).

Empowerment and Poverty Alleviation: People, particularly those who reside in rural and marginalized communities, who have access to high-quality agricultural education are more empowered because it provides opportunities for economic self-reliance and upward mobility. The curriculum equips aspiring farmers and agribusiness entrepreneurs with the skills, knowledge, and resources they need, making it a powerful instrument for promoting social inclusion, rural development, and the eradication of poverty.

Resilience to Climate Change: A curriculum for agricultural education is essential to strengthening the resilience of farming systems and livelihoods in the face of climate change and variability. By including risk management techniques, climate-smart agriculture methods, and adaptation measures into the curriculum, educational establishments equip interested parties to deal with the difficulties brought on by extreme weather, changing precipitation patterns, and other aspects of climate change.

Food Security and Nutrition: The mental and physical development of children and other vulnerable groups depends on food security. By eradicating hunger and malnutrition, food security enhances quality of life, reduces mortality rates, and improves health outcomes. Perhaps the most important is the fact that agriculture education curricula directly help the accomplishment of food security and improved nutrition outcomes (Omachi et al., 2022) The curriculum promotes increased agricultural productivity, a variety of food production systems, and better market access in order to combat hunger,

malnutrition, and food insecurity. This aids in giving Nigeria's growing population a consistent and nourishing source of food.

3. The Current Status of Agricultural Education Curriculum in Nigeria

The agricultural education curriculum in Nigeria has a significant impact on the knowledge, skills, and attitudes of those employed in the agricultural industry, ranging from farmers and extension agents to agricultural scientists and policymakers. A detailed examination of Nigeria's current agricultural education plan reveals both its benefits and drawbacks:

3.1 Historical Context and Evolution

Nigeria has a long history of agricultural education that began with the establishment of agricultural colleges and institutes during the colonial era. The field of agricultural education has evolved over time due to the introduction of numerous organisations, courses, and initiatives aimed at increasing agricultural development and producing a skilled work force. However, problems including outdated curricula, subpar facilities, and limited access to educational opportunities still exist (Morris et al., 2021).

3.2 Institutional Framework

Numerous educational institutions, including polytechnics, universities, colleges of agriculture, and facilities for vocational training, are located in Nigeria and offer agricultural curricula. These organisations are crucial for offering agricultural education at all levels, from basic farmer training to cutting-edge research and academic degrees. To ensure the quality and relevance of agricultural education, the Nigerian government supervises and commands the Federal Ministry of Agriculture and Rural Development and the National Board for Technical Education.

3.3 Curriculum Content and Relevance

Even with efforts to modernize the curriculum, there are still significant gaps in the agricultural education curriculum's relevancy and alignment with contemporary agricultural methods, technological advancements, and market demands. Many academic curricula still prioritise theory over practical skills, depriving students of the hands-on learning and technical expertise required for success in the workplace. Additionally, the curriculum usually overlooks innovative areas like as agribusiness, climate-smart agriculture, and value chain

management, which restricts graduates' ability to tackle new challenges and seize possibilities in the agricultural sector (Fernando, 2020).

3.4 Infrastructure and Resources

The quality of agricultural education in Nigeria is restricted by a lack of infrastructure and resources, including demonstration farms, lab spaces, and instructional materials. It is challenging for many educational institutions to secure funding, materials, and qualified teachers, which makes it difficult for them to offer top-notch training and instruction. These resource limitations must be addressed if agricultural education in Nigeria is to become more effective and competitive.

3.5 Partnerships and Collaboration

Collaboration between academic institutions, governmental agencies, corporate sector partners, and international organisations is essential to enhancing agricultural education in Nigeria. In order to improve faculty development, curriculum creation, and student learning, partnerships enable institutions to use outside expertise and support through information exchange, resource mobilization, and capacity building.

3.6 Inclusivity and Access

In remote and marginalised communities, where access to agricultural education is still limited, there is an especially pressing demand for trained agricultural experts. Gender disparities persist, as women are disproportionately underrepresented in agricultural education courses and extension activities. It is critical to address barriers to access, such as budgetary constraints, geographic isolation, and cultural norms, in order to guarantee that all prospective farmers and agribusiness professionals have the opportunity to gain from agricultural education (Ezhim et al., 2019).

The Link between Agricultural Education and Food Security in Nigeria Agricultural education plays a vital role in providing a link between skill training, knowledge gain, and sustainable farming practices in Nigeria's pursuit of food security. This partnership is crucial to resolving the intricate problems affecting Nigeria's food system and realizing the country's agricultural potential. A few significant elements highlight the intricate connection between food security and agricultural education:

3.7 Capacity Building and Skill Development

Agricultural education equips people with the technical know-how, data, and abilities needed to increase agricultural productivity, adopt sustainable farming practices, and get around production barriers, from farmers to agricultural scientists. Stakeholders may increase crop yields, maximise resource utilization, and diversify production systems through educational programmes that provide training in agronomy, livestock management, agribusiness, and agricultural engineering. This will ultimately increase food availability and security (Obaniyi, 2021).

3.8 Innovation and Technology Adoption

The agriculture sector is encouraged to innovate and embrace new technologies by agricultural education. This enables stakeholders to gain productivity, flexibility, and competitiveness by utilising advancements in biotechnology, digital technologies, and agricultural research. By integrating state-of-the-art research findings and practical applications into their curricula, educational institutions promote the adoption of precision farming, climate-smart agriculture, and value-added processing techniques. This promotes agricultural change and enhances the results for food security (Oyawole et al., 2020).

3.9 Sustainable Agriculture Practices

Agriculture education promotes the adoption of sustainable agriculture methods, which reduce environmental harm, protect natural resources, and strengthen ecosystem resilience. Programmes that convey knowledge of agroecology, soil conservation, water management, and integrated pest management help farmers develop a culture of environmental care. This encourages sustainability over the long run and guarantees that food production systems continue to be robust in the face of environmental problems like climate change (Rolando et al., 2017).

3.10 Market Access and Value Chain Development

Agricultural education helps farmers connect their output to markets, take advantage of value-added opportunities, and increase revenue. It also facilitates the creation of value chains and market access. Education institutions provide training in value chain management, post-harvest handling, and market analysis, which helps farmers become more resilient to food security and economically viable. This gives farmers the ability to find new markets, raise the calibre of their output, and bargain for lower prices.

3.11 Policy Advocacy and Governance Reform

The policy advocacy and governance reform initiatives that aim to address institutional constraints, structural obstacles, and policy gaps that obstruct agricultural development and food security include agricultural education. By fostering critical thinking, research skills, and policy analysis abilities, educational institutions empower stakeholders to participate in evidence-based policymaking, support pro-poor agricultural policies, and support inclusive agricultural transformation agendas that prioritise the needs of smallholder farmers and vulnerable communities (Obaniyi, 2021).

4. Challenges Faced in Achieving Food Security in Nigeria

Nigeria has a lot of promise for agriculture, but there are now a lot of barriers in the way, making it hard for the country to feed its growing population. These intricate concerns cover a wide range of distribution, production, administration, and accessibility aspects of agriculture. For a variety of factors, including the nation's reliance on old farming methods, its limited access to modern inputs and technologies, its poor management of soil fertility, and its dearth of extension services, Nigeria's agricultural output remains below potential. Low productivity makes it more difficult to produce enough food to meet the demands of a rapidly growing population, which exacerbates food insecurity (Donkor et al., 2019). Climate change poses a severe threat to Nigeria's agricultural output since it causes crop yields to decrease and farming operations to be disrupted by rising temperatures, erratic rainfall patterns, and extreme weather events. Deforestation, soil erosion, and biodiversity loss are examples of environmental degradation that worsens food insecurity in susceptible places. The resilience and viability of agriculture are further threatened by these issues.

Land fragmentation, shaky land tenure, and land rights disputes limit smallholder farmers' access to fertile land, which hinders agricultural output and growth. Similar to this, competition for water resources, poor irrigation methods, and water scarcity exacerbate production challenges, particularly in semi-arid regions with significant rainfall fluctuation (Alpízar, 2020). Nigeria's agricultural value chain is hampered by inadequate infrastructure, which includes poor road networks, a lack of storage facilities, and inefficient transportation systems. As a result, a lot of food is wasted or lost during the stages of harvesting, processing, storing, and transportation, increasing the possibility of shortages, price swings, and decreasing

food supply (Hammed, 2022). Rural poverty and a lack of resources like markets, loans, supplies, and extension services limit smallholder farmers' ability to invest in agricultural output, adopt modern technology, and get access to lucrative markets. Restricted access to financial institutions, market data, and agricultural extension services exacerbates poverty cycles and inequality, particularly for marginalised people (Bello, 2021).

In Nigeria, efforts to promote agricultural growth, attract private investment, and enhance food security are impeded by a lack of coherence in policy, inadequate regulatory frameworks, and institutional disarray. Successful agricultural policies and programmes are difficult to implement because of insufficient agency cooperation, policy contradictions, bureaucratic inefficiencies, and corruption. Food insecurity, relocation, and disturbances to agricultural activity are the results of ongoing hostilities. Farmer-herder skirmishes, tensions within communities, and insurgencies in some regions are a few instances of these conflicts. The presence of insecurity exacerbates food shortages and humanitarian crises in conflict-affected areas by impeding farmers' ability to cultivate their land, access markets, and engage in profitable activities (Olanrewaju, 2023).

While increasing public health and decreasing malnutrition require access to a range of nutrient-dense meals, food availability is a critical component of food security. In Nigeria, micronutrient deficiencies pose major health risks, particularly to women and children. This highlights the necessity of initiatives that promote a varied diet, nutrition instruction, and convenient access to goods enriched with nutrients. Nigeria's rapidly expanding metropolitan area and population strain agricultural resources, alter consumer behaviour, and raise food demand, all of which exacerbate the nation's food security issues. Urbanisation, which also results in land fragmentation, a decrease in the labour force employed in agriculture, and the loss of agricultural land to urban growth, erodes the nation's capacity to feed its population. Furthermore, food deserts, limited access to fresh produce, and rising food prices are common in metropolitan areas, all of which worsen food insecurity among disadvantaged groups residing in cities (Webb et al., 2016).

Despite its potential for agriculture, Nigeria still depends primarily on food imports to meet domestic demand for certain commodities like wheat, rice, and sugar. The country's reliance on imports puts food security and economic stability at risk since it leaves it vulnerable to fluctuations in external prices, unstable

currencies, and disruptions in the supply chain. Addressing the root causes of import dependency—poor local production, inadequate processing capacity, and trade restrictions—is necessary to increase food self-sufficiency and reduce vulnerability to external shocks (Nnamani, 2023). Insufficient access to sanitary facilities, healthcare services, and clean drinking water can lead to foodborne diseases, malnourishment, and food insecurity in Nigeria. Weak food safety rules, contaminated water supplies, and inadequate hygiene measures pose serious health risks, particularly in rural areas and unofficial food markets. Addressing health and sanitation issues is necessary to increase food security, reduce the burden of disease, and improve nutritional results (Ikelegbe, 2013). The lack of awareness about nutrition, sustainable farming practices, and food safety among consumers, producers, and policymakers hinders the advancement of food security in Nigeria. To help people make informed decisions, pick nutritious foods, and support sustainable food systems, some examples of education and awareness-raising activities are public campaigns, farmer training programmes, and nutrition instruction in schools. Financing agricultural extension programmes and knowledge-sharing websites can also assist farmers in implementing best practices, raising productivity, and adjusting to changing climatic conditions.

Nigeria may experience changes in domestic food prices and availability as a result of its vulnerability to market volatility, commodity price fluctuations, and international trade dynamics. Nigeria's integration into international markets is the cause of this. External variables that have an impact on local food markets, such as trade laws, export prohibitions, and disruptions in the global supply chain, can make food insecurity and economic vulnerabilities worse. Reducing the impact of global market dynamics on Nigeria's food security requires strengthening local agricultural value chains, increasing export markets, and enhancing trade resilience (Fabinin, 2021). Inadequate processes for data collection, monitoring, and assessment prevent Nigeria from tracking food security indicators, assessing progress, or using data to support evidence-based decision-making. Accurate statistics on food production, consumption, prices, and nutritional outcomes are essential for identifying gaps, focusing interventions, and monitoring the performance of food security projects. Investments in data infrastructure, capacity building, and research collaboration can strengthen Nigeria's food security information systems and enhance its capacity to address emerging issues (Osabohien et al., 2018).

5. The Role of Agricultural Education in Promoting Sustainable Farming Practices and its Importance in Technical Skills and Knowledge Transfer

Since agricultural education gives farmers the technical know-how, tools, and knowledge they need to adopt profitable and sustainable food production methods, it is crucial to the advancement of sustainable farming approaches. This educational framework not only facilitates a better understanding of agricultural ecosystems but also equips individuals with the means to implement methods that optimise resource efficiency, minimise environmental impact, and enhance long-term agricultural sustainability. Several significant elements emphasise the role that agricultural education plays in promoting sustainable farming practices and facilitating the transfer of technical knowledge and skills:

Holistic Understanding of Agricultural Systems:

Through agricultural education, students gain a thorough grasp of agricultural systems, including soil health, water management, biodiversity preservation, pest and disease control, and climate resilience. By introducing the ideas of agroecology, sustainable intensification, and ecosystem services into their curricula, educational institutions can aid students in understanding the interconnection of agricultural processes and ecosystems. This promotes a systems-thinking approach to farming among students, 78tilization sustainability and ecological balance (Pretty, 2018).

Practical Application and Experiential Learning:

In order to help students develop technical proficiency and practical experience in farm management, crop production, livestock husbandry, and operating agricultural machinery, agricultural education places a significant focus on experiential learning and practical application. Educational programmes provide students with the chance to put their theoretical knowledge to use in practical settings through field training, farm internships, and demonstration plots. This fosters creativity and adaptation while helping students polish their problem-solving abilities and practical skills (Lopez-Ridaura et al., 2017).

Promotion of Sustainable Farming Practices:

Agricultural education promotes the use of sustainable farming practices that maintain water resources, enhance soil health, use less chemicals, and protect biodiversity. Through the dissemination of information on techniques such as integrated pest management, crop rotation, agroforestry, conservation tillage, and organic farming, educational

establishments empower farmers to mitigate their ecological footprint, decelerate climate change, and enhance their farming systems' resilience against severe weather events and other exigencies (PV, 2022).

Technology and Innovation Integration:

Agricultural education enables farmers to maximise resource 78tilization, increase productivity, and enhance decision-making by employing digital tools, precision agriculture, and information technologies. It does this by integrating innovation and technology into farming operations. With the help of educational courses that teach skills like data analysis, GIS mapping, remote sensing, and farm automation, farmers may better adapt to the changing demands of modern agriculture and embrace cutting-edge technology.

Knowledge Transfer and Extension Services: Through agricultural education, knowledge transmission and extension services are made easier, giving rural people access to best practices, research findings, and technical expertise. Educational establishments employ outreach initiatives, farmer field schools, and extension programmes to establish a connection between research and practice. In the end, this increases farmers' resilience and productivity by enabling them to apply evidence-based solutions to agricultural difficulties, gather knowledge, and seek guidance (Camillone et al., 2020).

Capacity Building for Sustainable Development:

Ultimately, improving farmers', extension agents', and other agricultural professionals' capacity to promote sustainable development goals including environmental preservation, food security, and poverty reduction depends on agricultural education. Education programmes foster a culture of innovation, lifelong learning, and continuous development, which helps individuals be adaptable in the face of change, take on new challenges, and contribute to agriculture being a more resilient and sustainable business (Ezhim et al., 2019).

6. Conclusion

This article discusses the connection between food security and Nigeria's agricultural education plan, which has significant implications for the country's agricultural growth, economic progress, and social welfare. In this discourse, we have talked about the importance of agricultural education in equipping people with the knowledge, skills, and attitudes necessary to address problems pertaining to food security. By integrating agricultural education into the formal education system, promoting sustainable

agriculture practices, empowering smallholder farmers, and fostering innovation and entrepreneurship in the agricultural sector, Nigeria can enhance its capacity to attain food security and promote rural development in the near future. To achieve these goals, collaboration between governmental bodies, educational institutions, civil society organisations, and other stakeholders is required. Policy changes are needed to enhance agricultural education, promote sustainable farming practices, and create an environment that supports innovation and entrepreneurship in the agricultural sector. Investments in youth empowerment programmes, agricultural extension services, and vocational and technical education are essential to boosting the productivity and resilience of the agricultural sector as well as the abilities of farmers and agribusiness professionals. Therefore, incorporating agricultural education into the curriculum is essential for addressing the nation's current food security concerns as well as laying the foundation for Nigeria's agriculture to be prosperous and sustainable in the long run. Nigeria can secure its food supply and contribute to global efforts to achieve food security by endorsing sustainable farming practices and providing financial assistance for agricultural education.

7. Recommendations

A deliberate strategy that considers key elements like stakeholder participation, hands-on training, teaching tactics, and curriculum design is required to improve agricultural education curricula. It is possible to improve the effectiveness of agriculture education curricula by implementing the following strategies:

Ensure that the curriculum is routinely evaluated and updated to take into account market demands, industry trends, and the most recent technological advancements. Talking with different industry players, including agribusinesses, research institutes, and farmers, can provide valuable insights into the skills required and the most recent opportunities in the agricultural sector.

Incorporate experiential learning opportunities such as field trips, practical exercises, and hands-on training into the curriculum to provide students with real-world experience and skills. Pupils who undergo hands-on instruction are more prepared to use their academic knowledge, hone their problem-solving skills, and prepare for careers in agriculture.

To enhance student learning and prepare them for the digital age, include technology, digital tools, and new teaching strategies into the curriculum. To introduce students to current market trends, include courses on data analytics, precision agriculture, agri-tech solutions, remote sensing, and other cutting-edge technology.

To encourage interdisciplinary learning, include subjects like agronomy, economics, environmental science, and business management in the curriculum. In addition to fostering critical thinking and preparing students for a range of occupations in agriculture and related fields, multidisciplinary teaching approaches assist students in gaining a thorough understanding of agricultural systems.

Partner with agricultural firms, educational establishments, and governmental agencies to provide students with opportunities for internships, work placements, and industry attachment. Through industrial experience, students can investigate career options, connect with experts, and pick up useful skills while taking part in innovation and development in the business.

Incorporate entrepreneurship, marketing, finance, and agribusiness management courses into the curriculum to provide students the skills they need to start and manage successful agricultural enterprises. By fostering creativity, taking calculated risks, and adding value to agriculture, entrepreneurship education boosts economic growth and job creation in rural communities.

To promote creativity and research, encourage student participation in conferences, contests, and research initiatives. Accessible research facilities, labs, and funding sources will promote student-led research projects and innovation in agriculture.

In order to promote industry-led projects and mentorship programmes, improve the curriculum, and welcome guest speakers, foster connections with international organisations, non-governmental organisations, governmental agencies, and industry players. Incorporating industry methods into the curriculum increases students' exposure to it, ensures its relevance, and creates opportunities for career and employment progression.

Establish mechanisms for monitoring and evaluating the curriculum's effectiveness while accounting for student performance, industry feedback, and graduate outcomes. Use assessment results to identify areas that require improvement, improve instructional

methodologies, and update the curriculum to reflect evolving academic and industry requirements.

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