

Enhancing Food Security Through Agripreneurship: Evidence From Smalholder Maize Farmers In Niger State, Nigeria

Danladi Ahijoh Wallijoh,¹, Sunday C Eze,², Johnson Olaosebikan³, & Opeyimi Oyelude

^{1,2,3,4} Department of Business Administration, Bowen University, Iwo, Nigeria

Abstract

Agripreneurship is increasingly recognized as a pathway for improving agricultural productivity, livelihoods, and food security among smallholder farmers. However, empirical evidence on how entrepreneurial farming practices contribute to food security remains limited in Nigeria. This study examined the role of agripreneurship practices in enhancing food security among smallholder maize farmers in Niger State, Nigeria. Specifically, it assessed the extent to which improved seed varieties, post-harvest management, market-oriented farming, financial management and record keeping, and agricultural training and extension services contribute to food security. The study was anchored in the Diffusion of Innovation (DOI) and Triple Bottom Line (TBL) theories.

A quantitative cross-sectional survey design was adopted. Data were collected from 500 registered smallholder maize farmers selected through a multistage sampling procedure from the Maize Growers, Processors and Marketers Association of Nigeria (MAGPAMAN). Data were analyzed using Structural Equation Modelling (SEM) to assess the measurement model and test the hypothesized relationship between agripreneurship practices and food security.

The results revealed a strong, positive, and statistically significant effect of agripreneurship practices on food security ($\beta = 0.961$, $p < 0.001$). The findings demonstrated that the integrated adoption of improved seed varieties, effective post-harvest management, market-oriented farming, financial management and record keeping, and agricultural training and extension services substantially enhances farmers' food security. The magnitude of the standardized coefficient further indicated that agripreneurship practices constitute a critical pathway through which smallholder farming can improve food availability, accessibility, and utilization.

The study concluded that agripreneurship provides a significant pathway for strengthening food security among smallholder maize farming households in Niger State. It recommended coordinated policies that expand access to agricultural innovations, strengthen extension and entrepreneurial capacity, improve market and post-harvest systems, and enhance farmers' financial capabilities to promote resilient and sustainable food systems in Nigeria.

Keywords: Agripreneurship; Food Security; Smallholder Maize Farmers; Improved Seed Varieties; Market-Oriented Farming; Structural Equation Modelling; Niger State; Nigeria.

1. Introduction

Food security remains a persistent development challenge in sub-Saharan Africa, including Nigeria, where constraints in food availability, accessibility, and utilization continue to affect rural households (FAO, 2022). Although agriculture is central to food supply and rural livelihoods, smallholder farmers face low productivity, limited access to improved inputs and finance, weak extension services, post-harvest losses, and inadequate market integration (Ameh et al., 2020; Oladeji et al., 2024; Ogundej, 2024). Maize, one of Nigeria's major staple crops, is particularly important to household food security, yet its production remains constrained by these structural challenges (FAO, 2022; NBS, 2023).

Agripreneurship provides a potential pathway for addressing these challenges by integrating innovation, market orientation, financial management, and entrepreneurial decision-making into agricultural production. Such practices can improve productivity, reduce post-harvest losses, strengthen market participation, and enhance farm income and resilience (Kazungu & Kumburu, 2023; Ajisafe et al., 2024). The Diffusion of Innovation (DOI) theory explains how agricultural innovations are adopted and diffused among farmers (Rogers, 2003), while the Triple Bottom Line (TBL) perspective emphasizes the economic, social, and

environmental value generated through entrepreneurial activity (Elkington, 1997).

Existing evidence suggests that commercialization, agricultural finance, improved farm management, and extension services can contribute to household food security (Ameh et al., 2020; Ojo et al., 2023; Ajisafe et al., 2024). However, much of the literature examines individual agripreneurship components separately, providing limited evidence on how a combination of entrepreneurial farming practices contributes to the multidimensional dimensions of food security. This gap is particularly relevant in northern Nigeria, where agricultural potential coexists with persistent food-security challenges.

Therefore, this study examines the influence of agripreneurship practices on food security among smallholder maize farmers in Niger State, Nigeria. Agripreneurship is operationalized through five practices: Improved Seed Varieties (ISV), Post-Harvest Management (PHM), Market-Oriented Farming (MOF), Financial Management and Record Keeping (FMRK), and Agricultural Training and Extension Services (ATES). Food security is conceptualized through food availability, accessibility, and utilization. The study provides empirical evidence on whether the combined application of these practices contributes to improved food-security outcomes among smallholder maize-farming households.

2. Objectives

The study to examined the influence of agripreneurship practice - Improved Seed Varieties, Post-Harvest Management, Market-Oriented Farming, Financial Management and Record Keeping, and Agricultural Training and Extension Services—on food security, measured through food availability, accessibility, and utilization, among smallholder maize farmers in Niger State, Nigeria.

3. Methods

The study employed a quantitative cross-sectional survey design among smallholder maize farmers in Niger State, North-Central Nigeria. Data were collected across the state's three agricultural zones -Zone A (Minna axis), Zone B (Bida axis), and Zone C (Kontagora axis)—during the 2024/2025 farming

season. Niger State is a major maize-producing area characterized predominantly by rain-fed agriculture and provides an appropriate setting for examining the relationship between agripreneurship and household food security.

The target population comprised approximately 5,000 registered smallholder maize farmers affiliated with the Maize Growers, Processors and Marketers Association of Nigeria (MAGPAMAN) across the state's 25 Local Government Areas. A multistage sampling procedure was employed, with the three agricultural zones selected purposively and respondents subsequently selected across the LGAs using random sampling. The Yamane (1967) formula produced a minimum sample requirement of 370 respondents. To improve coverage and account for possible non-response, 600 questionnaires were distributed, of which 500 valid responses were retained for analysis.

Data were collected using a structured questionnaire comprising demographic information and measures of agripreneurship practices and food security. Agripreneurship was measured through five dimensions: Improved Seed Varieties (ISV), Post-Harvest Management (PHM), Market-Oriented Farming (MOF), Financial Management and Record Keeping (FMRK), and Agricultural Training and Extension Services (ATES). Food security was measured as a multidimensional construct comprising food availability, accessibility, and utilization. All constructs were measured using five-point Likert-scale items adapted from established instruments and contextualized to smallholder maize farming. Expert review established content validity, while a pilot test conducted with farmers outside the study sample produced a Cronbach's alpha of 0.88.

Data were analyzed using Structural Equation Modeling (SEM) in Stata version 15.1. Confirmatory Factor Analysis was first used to assess the reliability and validity of the measurement model, followed by structural model estimation to test the hypothesized relationship between agripreneurship practices and food security. Reliability and convergent validity were assessed using factor loadings, Cronbach's alpha, composite reliability, and average variance extracted, while model adequacy was evaluated using standard fit indices, including CFI, TLI, and RMSEA. Standardized

path coefficients and associated significance levels were used to determine the magnitude and statistical significance of the relationship between agripreneurship practices and food security.

4. Results

The structural model demonstrated a strong fit to the data. The model produced $\chi^2(151) = 198.22$ ($p = .006$), with a relative chi-square of 1.31. The RMSEA was .025 (90% CI [.014, .034]), while the CFI (.972), TLI (.968), and SRMR (.034) all indicated excellent model fit. The coefficient of determination ($CD = .939$) further indicated that the model accounted for approximately 93.9% of the variance in the observed food-security indicators.

The measurement model confirmed that all indicators loaded significantly on their respective constructs ($p < .001$). Standardized loadings for the agripreneurship dimensions ranged from .40 to .57, while food-security indicators showed loadings ranging from .47 to .58 for availability, .48 to .55 for accessibility, and .47 to .53 for utilization. These results support the multidimensional measurement of both agripreneurship practices and food security. The structural analysis revealed a strong, positive, and statistically significant relationship between agripreneurship practices and food security ($\beta = .961$, $SE = .111$, $z = 7.90$, $p < .001$). The null hypothesis that agripreneurship practices have no significant influence on food security was therefore rejected. Among the individual agripreneurship dimensions, market-oriented farming showed the strongest association with food security ($\beta = .78$), followed by post-harvest management ($\beta = .73$), agricultural training and extension services ($\beta = .70$), financial management and record keeping ($\beta = .66$), and improved seed varieties ($\beta = .63$). Overall, the findings indicate that agripreneurship, particularly through market engagement, post-harvest management, knowledge acquisition, and financial management, is strongly associated with improved food-security outcomes among smallholder maize farmers.

5. Discussion

The findings demonstrate that agripreneurship is a strong determinant of food security among smallholder maize farmers in Niger State. The significant positive relationship between

agripreneurship practices and food security ($\beta = .961$, $p < .001$) suggests that treating farming as an entrepreneurial activity can strengthen the three dimensions of food security - availability, accessibility, and utilization. This finding supports the view that smallholder food security is influenced not only by production capacity but also by farmers' ability to commercialize output, manage resources, reduce losses, and acquire relevant knowledge.

The relatively stronger contribution of market-oriented farming and post-harvest management is particularly important. Market orientation can improve household food access by strengthening farmers' participation in output markets and increasing the income available for food purchases, while effective post-harvest management preserves food that would otherwise be lost. The findings therefore reinforce evidence that commercialization and loss reduction are important pathways through which smallholder agriculture contributes to household food security (Ajisafe et al., 2024; Abass et al., 2020; Affognon et al., 2021). This also suggests that policies focused exclusively on increasing farm output may have limited food-security effects if farmers remain poorly connected to markets or lose a substantial proportion of production after harvest.

The contributions of agricultural training and extension services and financial management and record keeping further demonstrate the importance of farmers' managerial and knowledge capacities. Extension services can improve farmers' ability to apply production and post-harvest innovations, while financial management supports more deliberate allocation of farm resources and investment decisions. These findings are consistent with evidence linking agricultural advisory services and financial capability with improved farm performance and household welfare (Ragasa et al., 2020; Ogunniyi et al., 2021). Agripreneurship therefore extends beyond the adoption of physical technologies to include the knowledge and managerial capabilities required to convert agricultural resources into sustainable livelihood outcomes.

Improved seed varieties also showed a positive association with food security, although their relative contribution was lower than those of

market-oriented farming and post-harvest management. This finding suggests that productivity-enhancing technologies are important but may not independently guarantee household food security. Their benefits depend partly on farmers' capacity to obtain complementary inputs, manage production effectively, reduce post-harvest losses, and convert surplus production into reliable income. This provides support for the Diffusion of Innovation perspective, which emphasizes the adoption and utilization of innovations, while the Triple Bottom Line perspective highlights the need to translate agricultural innovation into economic and social welfare outcomes.

The comparatively moderate loadings of some food-utilization indicators also suggest that increased agricultural production and income do not automatically translate into improved dietary outcomes. Food-security interventions may therefore need to complement agripreneurship promotion with nutrition education and measures that improve the quality and diversity of household diets. Taken together, the findings indicate that agripreneurship contributes to food security through a combination of production, commercialization, loss reduction, financial management, and knowledge pathways. Consequently, agricultural policies should move beyond input-focused interventions toward integrated programmes that strengthen entrepreneurial capabilities, market participation, post-harvest systems, financial literacy, and extension delivery among smallholder farmers.

6. Conclusion

This study demonstrates that agripreneurship practices are strongly and positively associated with food security among smallholder maize farmers in Niger State, Nigeria. The significant structural relationship ($\beta = .961$, $p < .001$) indicates that entrepreneurial approaches to farming can contribute substantially to household food availability, accessibility, and utilization. Among the practices examined, market-oriented farming and post-harvest management showed the strongest associations with food-security outcomes, followed by agricultural training and extension services,

financial management and record keeping, and improved seed varieties.

The findings extend existing food-security research by demonstrating that agripreneurship provides a multidimensional pathway through which production, commercialization, resource management, knowledge, and post-harvest practices jointly contribute to household food security. The study therefore concludes that strengthening food security among smallholder maize farmers requires policies that promote not only agricultural technologies but also market integration, post-harvest management, financial capability, and effective extension services. An integrated agripreneurship approach can contribute to more resilient smallholder farming systems and improved food-security outcomes in Nigeria and comparable agricultural settings.

References:

1. Adebayo, I. O., Omotoso, S. O., Salman, K. K., Omotayo, A. O., Olagunju, K. O., & Aremu, A. O. (2021). Socio-economic drivers of food security among rural households in Nigeria: Evidence from smallholder maize farmers. *Social Indicators Research*, 155(2), 583–599. <https://doi.org/10.1007/s11205-020-02590-7>
2. Ajisafe, O. G., Idiaye, C. O., & Oluwatayo, I. B. (2024). Agricultural commercialization and smallholder farmers' food security in Nigeria. <https://doi.org/10.22004/ag.econ.356808>
3. Ayinde, I. A., Otekunrin, O. A., Akinbode, S. O., & Otekunrin, O. A. (2020). Food security in Nigeria: impetus for growth and development. *J. Agric. Econ*, 6(2), 808-820. https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=Akinbode
4. Kazungu, I., & Kumburu, N. P. (2023). Agripreneurship as a panacea for food security in Tanzania: A systematic review. *Heliyon*, 9(2).
5. Olasehinde-Williams, W., Adedoyin, F. T., Bekun, F. V. (2020). Pathway to Achieving Sustainable Food Security in Sub-Sahara Africa: The Role of Agricultural Mechanization. *Journal of Labor and Society*, 23(1) <https://www.researchgate.net/publication/3422166567>

6. Ameh, J., Oladimeji, Y. U., & Ouagbabe, O. O. (2020). Assessment of households' food security and production constraints of maize farmers in Kaduna State, Nigeria. *Journal of Agripreneurship and Sustainable Development*, 3(3), 1-12.
<https://doi.org/10.59331/jasd.v3i3.130>
7. Elkington, J., & Rowlands, I. H. (1999). Cannibals with forks: The triple bottom line of 21st century business. *Alternatives Journal*, 25(4), 42.
8. FAO. (2019). The State of Food and Agriculture 2019. Moving forward on food loss and waste reduction. Rome. CC BY-NC-SA 3.0 IGO.
9. FAO. (2022). State of Food Security and Nutrition in the World. Rome: Food and Agriculture Organization.
<https://doi.org/10.4060/cc0639en>
10. National Bureau of Statistics. (2023). Agricultural performance survey report. NBS. NGA-NBS- NASS-2023-v01
11. Ogundeji, A. A. (2024). Impact of participation in social capital networks on the technical efficiency of maize producers in Southwest Nigeria. *Agriculture & Food Security*, 13, Article 12.
<https://doi.org/10.1186/s40066-023-00464-y>
12. Ojo, B., Olalere, I., Bello, M., & Bello, J. (2023). Effect of the Anchor Borrowers' Programme on the food security of smallholder maize farming households in Kwara State, Nigeria. *Journal of Agribusiness and Rural Development*, 68(2), 197–203.
<https://doi.org/10.17306/J.JARD.2023.01595>
13. Oladeji, S. O., Olatunji, A. T., Jamiyu, A. G., Ibirogba, O. R., & Ogunola, A. A. (2024). Socio-economic drivers of food security among smallholder rural household maize farmers in Oyo State, Nigeria. *Nigerian Journal of Agriculture and Agricultural Technology*, 4(1), 169–176.
<https://doi.org/10.59331/njaat.v4i1.639>
14. Rogers, E. M. (2003). *Diffusion of Innovations* (5th ed.). Free Press.
15. Yamane, T. (1973). *Statistics: An Introductory Analysis* (2nd ed.). Harper & Row.