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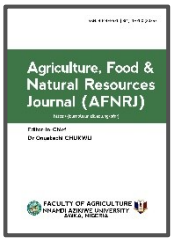

Original Article

Agriculture as a retirement income safety net: Evidence from civil servants in Northeastern Nigeria

OPEN ACCESS

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ABSTRACT

Amid persistent economic challenges in Nigeria, marked by inflationary pressures, currency devaluation, and concerns over the long-term sustainability of public sector income, agriculture has emerged as a critical livelihood and retirement income strategy for civil servants. This study examines the extent and nature of agricultural engagement among civil servants in Northeast Nigeria, with a focus on its potential as a retirement income safety net. Drawing on survey data from 179 staff members of federal universities across Gombe, Borno, and Adamawa States, the findings reveal a high rate of participation in agricultural activities, predominantly crop farming (70.8%). However, such engagement remains largely small-scale due to limited access to capital (Mean = 3.7472, SD = 1.2250), which hampers investment in mechanized farming. The most frequently cultivated crops are maize (31.1%), beans (26.2%), and rice (22.2%). Civil servants who participate in agriculture report significantly greater financial stability (Mean = 3.8218, SD = 0.9839), reduced reliance on government salaries (Mean = 3.7861, SD = 1.1338), and enhanced resilience to economic shocks (Mean = 3.7733, SD = 0.9857) compared to their situation prior to agricultural involvement. These findings underscore the role of agriculture as a viable pathway to economic security in retirement. The study recommends improved access to agricultural finance, extension services, and market infrastructure to support productivity, facilitate economic diversification, and reinforce the post-retirement welfare of public sector employees.

KEYWORDS: *Economic resilience, Household welfare, Livelihood diversification Pension,*

INTRODUCTION

Civil servants are globally characterized by a strong commitment to public service motivation (PSM), dedicating significant portions of their professional lives to promoting national development and public welfare (Kim, 2020; Hameduddin & Engbers, 2022). In recognition of their long-standing service, it is ethically and socially imperative that they anticipate a dignified and financially secure retirement. In advanced economies such as the Netherlands, Denmark, and Iceland, such expectations are often fulfilled through robust pension systems (Organisation for Economic Co-operation and Development [OECD], 2023). Iceland, for instance, operates a dual-pillar pension model that combines mandatory contributions with voluntary savings, ensuring high replacement rates and reducing post-retirement income disparities (Ang, 2021; Fritz, 2022; OECD, 2023).

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In contrast, civil servants in developing countries like Nigeria frequently face significant insecurity regarding retirement welfare, largely due to deep-rooted structural inefficiencies in the public pension system. These include administrative bottlenecks (Oparanma, 2011; Nweke, 2014), delays in disbursement (Pillah & Gwimi, 2025), and corruption (Omole, 2020; Pillah & Gwimi, 2025). These systemic deficiencies erode public trust and exacerbate anxiety, compelling some civil servants to adopt informal coping mechanisms, including unethical practices (Udoh, 2022; Olasupo & Onuoha, 2023). Thus, agriculture has emerged as one of the most viable and ethically permissible avenues for income diversification (Ihesiulo, 2018; Ohwofasa & Matthew, 2022).

Globally, agriculture is central to food security, employment, and poverty reduction (Modi, 2018; Osabohien *et al.,* 2019). The sector is also pivotal to achieving key United Nations Sustainable Development Goals (SDGs), including SDG 1 (No Poverty) and SDG 2 (Zero Hunger). In Nigeria, civil servants increasingly engage in agriculture as a supplementary livelihood. Whereas, non-oil exports - including agricultural products - generated $4.82 billion in 2022, reflecting a 39.91% increase from the previous year (Adeleke, 2023). Empirical evidence from West Africa supports this trend. In Ghana, Bolang *et al.* (2023) found that 85.2% of civil servants engaged in farming for food self-sufficiency and income supplementation. In Nigeria, Abdulaleem *et al.* (2023) observed that income shocks led many civil servants to adopt informal coping strategies, though the influence of social capital was underexplored.

Agricultural commercialization presents transformative potential. While it has reduced poverty and enhanced livelihoods in countries like Kenya (Ogutu & Qaim, 2019) and Vietnam (Cazzuffi *et al.,* 2020), structural barriers such as limited infrastructure and insecure land tenure constrain its inclusivity. In Nigeria, factors such as access to land, credit, and inputs have been identified as critical enablers of productivity (Olujenyo, 2008; Kator, 2019), though institutional bottlenecks persist. Macroeconomic analyses reinforce agriculture's developmental significance, linking it to GDP growth and labour productivity (Awoyemi *et al.,* 2017). For many civil servants, subsistence farming remains essential for household food security (Yisa *et al.,* 2010).

Despite its potential, the adoption of agriculture as a livelihood strategy among Nigerian civil servants, especially in Northeast Nigeria, remains inconsistent. Evidence suggests that small-scale farming has helped reduce financial vulnerability in the region (Ihesiulo, 2018). In response, the Nigerian government has initiated programmes such as the Exit Management Programme to train soon-to-retire civil servants in agribusiness (Oyeyemi, 2018). Complementary studies support the viability of agriculture as a pathway to financial security in the public sector (Aliyu, 2023).

Nevertheless, significant knowledge gaps remain concerning the enablers and constraints of agricultural engagement among civil servants. This study, therefore, investigates the role of agriculture as an income diversification strategy for civil servants in Northeast Nigeria. It explores how agricultural activities can serve as a coping mechanism for retirement insecurity and economic instability, with the aim of generating policy-relevant insights for sustainable livelihoods in the public sector.

MATERIALS AND METHODS

Study Area

The research was conducted using data from three states in the Northeast, Nigeria - Gombe, Borno, and Adamawa States. The selection of three states was influenced by resource optimization and the need to maintain analytical depth. Expanding the study to all six states would diffuse the research focus, strain logistical and financial resources, and affect the quality of engagement with respondents. The chosen states provide a manageable yet sufficiently diverse sample to ensure data saturation and meaningful regional representation. Gombe State often referred to as the "Jewel in the Savannah," is characterized by a mix of savanna and semi-arid landscapes. The state has a strong agricultural sector, cultivating grains such as rice, beans, millet, and maize, alongside livestock farming (Oxford Business Group, 2024). The economy of Gombe is largely agrarian, with trade also playing a significant role in its economic structure (Oxford Business Group, 2024).

Borno State, the largest state in Nigeria by land area, is strategically positioned in West Africa, sharing borders with Chad, Niger, and Cameroon (Soluap, 2024). The state is predominantly covered in savanna vegetation, supporting extensive agricultural activities. Agriculture remains the backbone of Borno's economy, providing employment and food security for over 70% of its population (CGIAR, 2024). However, challenges such as declining soil fertility, insecurity, climate change, and infrastructural limitations continue to impact agricultural productivity.

Adamawa state features a diverse terrain, including hills, plateaus, and river valleys, notably along the Benue River (Infomediang, 2022). Agriculture is the mainstay of about 80% of the state's inhabitants, with the ecological conditions supporting the cultivation of root crops (sweet potatoes, yam, cassava), cereals (maize, sorghum, millet, rice), and livestock farming (CGIAR, 2024). Despite its agricultural potential, Adamawa faces challenges such as climate change, low farm input availability, and limited investment in infrastructure. These states share a strong reliance on agriculture, making them relevant for research on agricultural sustainability and economic resilience.

Population and Sample

The study population comprised academic and non-academic staff members from three selected federal universities - Modibbo Adama University (MAU), Nigerian Army University Biu (NAUB), and Federal University Kashere (FUK) - who are

actively engaged in agricultural activities alongside their primary academic responsibilities. Preliminary field assessments confirmed that approximately 500 staff members from MAU and NAUB, and about 1,300 from FUK were involved in various forms of farming, reflecting the growing trend of civil servants diversifying into agriculture for household food security and supplementary income. To ensure methodological rigor in determining an appropriate sample size, both GPower analysis and Yamane's formula were applied. GPower, based on a power threshold of 0.80 and medium effect size, suggested a minimum sample size of 128 respondents, while Yamane's formula, which accounts for finite population correction, recommended 341 respondents at a 95% confidence level. Considering the need to balance statistical power, resource availability, and field accessibility, a final sample size of 235 respondents was adopted. Proportional stratified sampling was employed to reflect the actual distribution of staff engaged in agriculture across the institutions, resulting in 129 respondents from Federal University Kashere, and 53 respondents each from Modibbo Adama University and Nigerian Army University Biu. This approach ensured representativeness while maintaining statistical validity and logistical feasibility.

Data Collection Method and Analysis

This study adopted a cross-sectional survey research design, utilizing a structured questionnaire as the primary instrument for data collection. The questionnaire was administered to both academic and non-academic staff of three federal universities in Northeast Nigeria: Federal University Kashere (Gombe State), Nigerian Army University Biu (Borno State), and Modibbo Adama University Yola (Adamawa State). A stratified purposeful random sampling technique was employed to ensure a representative selection of respondents. The collected data were analyzed using both descriptive and inferential statistical methods. This involves the use of percentages, mean scores, and regression analysis.

Discussion

Out of the 235 questionnaires distributed across the three Universities, 179 were successfully returned. The reliability of the survey instrument was assessed through the Cronbach's Alpha reliability test. The Cronbach's Alpha value for the 46 items in the scale is 0.728. This value falls within the acceptable reliability range ($0.7 \leq \alpha < 0.8$), indicating that the scale has moderate internal consistency (Arof *et al.*, 2018).

Extent of Civil Servants' Engagement in Agriculture

As shown in Table 1, crop farming (93.3%) is the dominant activity among civil servants, likely due to its low entry barriers and food security benefits. Poultry (18.1%) and livestock farming (13%) reflect moderate diversification, while fish farming (7.3%) is least practiced, likely due to higher resource demands. Maize (67.3%) is the most cultivated crop, followed by beans (56.7%) and rice (48.0%), driven by demand and adaptability. Less common crops include sorghum, soya beans, millet, and others (under 4%), indicating limited focus on root crops and oilseeds among civil servant farmers. This aligns with previous research by Olujenyo (2008) and Ihesiulo (2018), who found that crop cultivation, especially of staple crops like maize, beans, and rice, is common among smallholder farmers due to its low entry requirements and food security benefits. The preference for staple crops is further validated by Awoyemi *et al.* (2017), who emphasized the role of traditional crops in household resilience and food systems in Nigeria.

Table 1: Types of Agricultural Activities Engaged in by Civil Servants

Agricultural Activities	Responses	
	N	Percent
Crop farming	165	93.2
Four legs animal farming	23	13.0
Poultry farming	32	18.1
Fish farming	13	7.3
Crops Planted		
Maize	115	67.3
Bean	97	56.7
Rice	82	48.0
Sorghum	12	7.0
Soya bean	47	27.5
Millet	11	6.4
Groundnut	2	1.2
Potatoes	2	1.2
Cassava	1	0.6
Sesame seeds	1	0.6

Source: Authors' Computation (2025)

Table 2 depicts the scope (size) and depth (duration) of agricultural engagement among civil servants. Most respondents (87.4%) are small-scale farmers, with 50.9% cultivating 1–5 acres and 36.6% farming less than 1 acre, suggesting agriculture is primarily a supplementary income source. Only 4.6% engage in large-scale farming (over 15 acres). In terms of duration, 32.8% have farmed for over 10 years, indicating long-term commitment, while 20.9% report 6–10 years of experience. However, 46.3% are recent entrants (under 6 years), likely driven by economic need or interest. The findings of this study align with previous research on civil servants' participation in agriculture, particularly regarding the dominance of small-scale farming and the reliance on personal savings for farm investment. Additionally, the preference for crop farming, particularly maize, beans, and rice, mirrors the findings of Olujenyo (2008), who identified staple crop cultivation as the dominant practice among smallholder farmers in Nigeria.

Table 2: Civil Servants' Farm Size and Farming Duration

Farm Size	Responses	
	N	Percent
Less than 1 acre	64	36.6
1 – 5 acres	89	50.9
6 – 10 acres	10	5.7
11 – 15 acres	4	2.3
More than 15 acres	8	4.6
Farming Duration		
1 – 3 years	41	23.2
3 – 6 years	41	23.2
6 – 10 years	37	20.9
More than 10 years	58	32.8

Source: Authors' Computation (2025)

Impact of civil servants' agricultural practices on economic outcomes

The analysis of civil servants' agricultural engagement reveals significant economic impacts, with varying levels of contribution to household income, financial stability, reliance on salaries, household expenses, savings, and financial resilience (Table 3). The mean values provide insight into the extent of agreement with each economic outcome, while the standard deviations reflect variability in responses.

As shown in Table 3, result indicates that among the economic indicators, financial stability (Mean = 3.82) and resilience to economic shocks (Mean = 3.77) rank highest, suggesting that agriculture enhances civil servants' financial security. The low standard deviations reflect consistent views. Reduced reliance on civil service salaries (Mean = 3.79) indicates that agriculture offers a viable alternative income stream. Agricultural income also supports savings and investment (Mean = 3.63). While many use farm earnings for household expenses (Mean = 3.36), variation suggests differing reliance levels. However, agriculture's direct contribution to household income is lowest (Mean = 2.56), implying limited cash flow from mainly small-scale, subsistence farming. The findings highlight the strategic role of agriculture in improving civil servants' financial security, particularly in times of economic hardship. However, the relatively low impact on direct income generation suggests a need for more support in transitioning from subsistence farming to profitable agribusiness ventures. Policies promoting access to credit, mechanization, and market linkages could enhance agricultural productivity and profitability. This finding corroborates the work of Abdulaleem *et al.* (2023), who reported that farming helped civil servant households in Southwest Nigeria cope with economic downturns. Similarly, Ogutu and Qaim (2019) found that agricultural commercialization is associated with reductions in multidimensional poverty and improvements in household welfare. However, the present study diverges slightly, as civil servants' engagement appears to be motivated more by subsistence and household food security than by market-driven commercial agriculture.

To further examine these relationships, a regression analysis was conducted to assess the impact of various agricultural practices on civil servants' economic outcomes. Financial stability is used as the dependent variable, given its highest mean score among the economic indicators and its central relevance to economic well-being. This approach aims to identify which specific agricultural practices, such as farm size, farming duration, and type of farming, significantly influence civil servants' perceived financial stability. The use of financial stability as the outcome variable is justified by its strong association with overall economic resilience and reduced dependency on government salaries, as highlighted in the earlier descriptive results. The regression result presented in Table 4.

Table 3: Impact of civil servants' agricultural practices on economic outcomes

Agric practices	N	Missing values	Mean	Std. Dev
Contribution to HH income	176	3	2.5568	1.17942
Financial stability	174	5	3.8218	0.98391
Reduced reliance on salary	173	6	3.7861	1.13375
Finance household expenses	173	6	3.3642	1.28962
Enhanced household savings/investment capacity	175	4	3.6343	1.02999
Financial resilience during economic downturns	172	7	3.7733	0.98574

Source: *Authors' Computation (2025)*

As shown in Table 4, the regression model is statistically significant and explains approximately 34.3% of the variance in financial stability among civil servants, indicating a moderately strong relationship between agricultural practices and financial well-being. Farm size (β = 0.278, p = 0.004) and farming duration (β = 0.174, p = 0.046) are significant predictors, suggesting that larger farms and longer involvement in agriculture positively influence financial stability. Crop farming also emerges as a strong contributor (β = 0.230, p = 0.005), reflecting its central role in sustaining household economies. Additionally, weekly hours spent on farming significantly predicts financial stability (β = 0.152, p = 0.027), implying that time commitment enhances outcomes. However, poultry, livestock, and fish farming do not show significant effects, possibly due to their limited scale or participation among the respondents. This supports the notion that greater agricultural involvement translates to higher economic benefits, consistent with the conclusions of Cazzuffi *et al.* (2020) in Vietnam.

Table 4: Linear Regression of Agricultural Practices on Financial Stability

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.101	0.422		4.98	0.000
	Farm size (acres)	0.183	0.062	0.278	2.95	0.004
	Farming duration (years)	0.091	0.044	0.174	2.02	0.046
	Weekly hours on farming	0.063	0.028	0.152	2.25	0.027
	Crop farming (Yes=1)	0.315	0.109	0.230	2.89	0.005
	Poultry farming (Yes=1)	0.127	0.093	0.093	1.37	0.174
	Livestock farming (Yes=1)	0.094	0.087	0.072	1.08	0.284
	Fish farming (Yes=1)	0.045	0.104	0.027	0.43	0.668
F: 10.73		R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
Sig.: 0.001		.586	.343	.311	.726	1.945
a. Dependent Variable: financial stability						

Source: *Authors' Computation (2025)*

Challenges to agricultural participation

Table 5 reveals that the most significant barrier to agricultural participation among civil servants is limited access to capital or credit (Mean = 3.75, SD = 1.23), indicating widespread financial constraints that hinder investment in inputs and farm expansion. Civil service duties follow closely (Mean = 3.54), reflecting the difficulty of balancing government work with farming. Access to farmland (Mean = 3.46) and unfavorable government policies (Mean = 3.38) are also notable challenges, though respondents' experiences vary. Weather conditions pose a moderate barrier (Mean = 3.14), especially for rain-fed farmers. In contrast, lack of agricultural knowledge (Mean = 2.64) and market access (Mean = 2.41) are seen as less significant, with low standard deviations suggesting broad agreement that these are not major issues. Overall, the findings suggest that financial, institutional, and structural factors pose greater constraints than knowledge or market-related issues in civil servants' agricultural engagement. Building on Kator's (2019) findings, which identified financial constraints and time limitations as barriers to civil servants' participation in agriculture in Delta State, Nigeria, this study reveals that civil servants' duties and restricted access to credit are significant impediments to full-scale farming.

Table 5: Challenges hindering civil servants' participation in agriculture

Factors	N	Missing values	Mean	Std. Dev
Civil service duties	178	1	3.5393	1.18423
Access to capital/credit	178	1	3.7472	1.22503
Access to farmland	178	1	3.4551	1.23997
Government policies	178	1	3.3820	1.31489
Lack of agricultural knowledge	176	3	2.6364	1.19697
Access to markets	176	3	2.4091	1.07050
Weather conditions	174	5	3.1437	1.23861

Source: *Authors' Computation (2025)*

CONCLUSION AND RECOMMENDATIONS

The study established that agriculture significantly supplements the income of civil servants in Northeastern Nigeria, serving as a retirement safety net by enhancing financial stability and household food security despite being largely small-scale and constrained by financial and institutional barriers. To strengthen this role, government and relevant stakeholders should provide accessible credit facilities, targeted subsidies, and capacity-building programmes, while improving infrastructure and market access to enable civil servants to move beyond subsistence farming and maximize agriculture's potential for economic resilience and national food security.

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Authors' Contributions

ELB conceptualized the research idea and provided overall direction and supervision for the study. FAI drafted the introduction, formulated the research objectives, and made substantial contributions to the literature review. AQB led the development of the methodology and carried out the data analysis and interpretation. HOT contributed to the literature review and assisted with sourcing relevant academic materials. MKH was responsible for data collection and initial field engagement. All authors reviewed and approved the final version of the manuscript.

Ethical Statement

This study did not involve any procedures requiring ethical approval. However, all research activities were conducted in line with standard academic and institutional ethical guidelines.

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