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Evaluating the Effectiveness of Ogun State Agricultural Development Programme Extension Services on Smallholder Farmers' productivity in Ijebu-Ode, Ogun State

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Abstract
Smallholder farmers in Ijebu-Ode Agricultural Zone Ogun State Nigeria face persistent barriers to productivity, including limited access to credit, low mechanization and inadequate extension services. This study evaluates the effectiveness of the Ogun State Agricultural Development Programme (OGADEP) in enhancing farmer productivity using a descriptive survey design. Data were collected from 126 randomly selected farmers across three extension blocks (Ijebu-Ife, Isoyin, and Ala) via a structured questionnaire. The results revealed a male-dominated (63.5%), middle-aged (mean = 45 years) farming population with small farms (mean = 1.61 hectares), limited access to credit (31.7%), and minimal government support (23.8%). OGADEP's services were rated highly for relevance (mean = 3.44) and farm management improvement (mean = 3.40) but lower for accessibility (mean = 2.86) and timeliness (mean = 2.97). Logit regression (Pseudo R^2 = 0.47) identified crop yield, improved seeds, farm income, and soil management as significant productivity drivers ($p < 0.01$). Despite farmers' experience and moderate education, productivity is constrained by infrequent extension visits and unequal access. It is concluded that smallholder farmers in the Ijebu-Ode Agricultural Zone possess considerable farming experience and modest education, their productivity remains hindered by limited access to credit, poor mechanization, inadequate government support, and unequal access to extension services. It is therefore, recommended that expanding OGADEP's outreach through more agents, timely services, ICT-based platforms, and regular workshops, alongside promoting credit schemes, mechanization, cooperative formation, and integrating weather and market advisories be provided to boost agricultural productivity of the smallholder farmers.

Keywords: Agricultural extension, Smallholder farmers, OGADEP, Productivity, Sustainable agriculture

INTRODUCTION

Agriculture is a vital sector in Nigeria's economy, with smallholder farmers playing a central role in food production, rural employment, and poverty alleviation. Despite their importance, smallholder farmers continue to face numerous challenges that hinder their productivity and contribution to national food security. Limited access to quality inputs, poor infrastructure, and weak institutional support ongoing barriers that prevent these farmers from reaching their full potential (Oladele, 2021). Among these challenges, inadequate agricultural extension services remain one of the most significant obstacles to improving productivity and encourage

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sustainable agricultural practices (Adebayo & Idowu, 2020).

Agricultural extension services serve as a critical link between research institutions and farmers, providing technical advice, training, and support needed to adopt improved farming methods. In Ogun State, the Ogun State Agricultural Development Programme (OGADEP) is mandated to provide these services, aiming to increase smallholder farmers' productivity and livelihoods. However, despite decades of intervention, there is evidence that many farmers in the Ijebu-Ode Agricultural Zone continue to struggle with low productivity, limited adoption of improved agricultural practices, and poor access to markets (Oyesola & Obabire, 2021). This raises concerns about the effectiveness, accessibility, and relevance of OGADEP's extension services in meeting the needs of farmers.

Several studies have highlighted systemic challenges within Nigeria's agricultural extension framework, including inadequate funding, poor staffing, and low farmer-to-extension agent ratios (Ajayi *et al*., 2021; Oluwasegun *et al*., 2023). These challenges are further worsened by logistical difficulties and weak coordination between extension agencies and local farmers, resulting in poor service delivery. Additionally, the lack of empirical data on the influence of OGADEP's extension services in the Ijebu-Ode Agricultural Zone on farmers' productivity has made it difficult to evaluate the programme's success or identify areas for improvement. Considering the vital contribution of extension services in boosting agricultural productivity, it is imperative to evaluate the effectiveness of OGADEP's interventions in addressing the challenges faced by smallholder farmers. This study aimed to address this gap by evaluating the influence of OGADEP's extension services on smallholder farmers' productivity in the Ijebu-Ode Agricultural Zone.

METHODOLOGY

This study adopted a descriptive survey design to assess the influence of OGADEP's extension services on smallholder farmers' productivity in the Ijebu-Ode Agricultural Zone of Ogun State. The area, known for diverse agricultural activities, was selected for its relevance to food production and ongoing challenges such as limited access to resources and support. The study population comprised smallholder farmers registered with OGADEP. A multi-stage sampling technique was used. The Ijebu-Ode zone was selected from the four agricultural zones in Ogun State. Three of its six extension blocks (Ijebu-Ife, Isoyin, and Ala) were randomly chosen, followed by 50% of their cells. Of the 632 registered smallholder farmers in these cells, 20% (126 respondents) were randomly selected. Data were collected using a structured questionnaire covering socio-economic characteristics, access to and utilization of extension services and productivity outcomes. The instrument included both closed and open-ended items and was validated by experts, pilot-tested, and refined. Data was analyzed using descriptive (means, frequencies) and inferential statistics (Logit regression, hypothesis testing).

RESULTS AND DISCUSSIONS

Table 1a. Distributions of Smallholders farmers based on their Socio-Economic Characteristics.

Variable	Category	Frequency	Percentage (%)	Mean
Age	Below 30 years	15	11.9	45 years
	30 – 39 years	30	23.8	
	40 – 49 years	35	27.8	
	50 – 59 years	28	22.2	
	60 years and above	18	14.3	
Gender	Male	80	63.5	-
	Female	46	36.5	
Marital Status	Single	10	7.9	-

	Married	90	71.4	
	Divorced	8	6.3	
	Widowed	18	14.3	
Educational Level	No formal education	25	19.8	-
	Primary education	40	31.7	
	Secondary education	45	35.7	
	Tertiary education	16	12.7	
Household Size	1 – 3 members	20	15.9	6 members
	4 – 6 members	65	51.6	
	More than 6 members	41	32.5	
Farm Size	Below 1 hectare	50	39.7	1.61 hectares
	1 – 2 hectares	55	43.7	
	3 – 5 hectares	15	11.9	
	Above 5 hectares	6	4.8	
Years of Farming Experience	Less than 5 years	20	15.9	12 years
	5 – 10 years	35	27.8	
	11 – 15 years	30	23.8	
	Above 15 years	41	32.5	
Main Crop/Livestock Produced	Maize	40	31.7	-
	Cassava	45	35.7	
	Vegetables	20	15.9	
	Poultry	15	11.9	
	Fishery	5	4.0	
	Others	1	0.8	

Table 1b. Distributions of smallholder Farmers based on their Socio-Economic Characteristics.

Variable	Category	Frequency	Percentage (%)	Mean
Annual Farm Income (₦)	Below 100,000	30	23.8	₦ 254,761.90
	100,000 – 300,000	50	39.7	
	300,001 – 500,000	35	27.8	
	Above 500,000	11	8.7	
Membership of Farmers' Association	Yes	70	55.6	-
	No	56	44.4	
Access to Credit Facilities	Yes	40	31.7	-

	No	86	68.3	
Major Source of Labour	Family labour	60	47.6	-
	Hired labour	45	35.7	
	Mechanized labour	10	7.9	
	Cooperative effort	11	8.7	
Ownership of Farming Equipment	Yes	50	39.7	-
	No	76	60.3	
Other Sources of Income	Yes	65	51.6	-
	No	61	48.4	
Access to Other Government Support	Yes	30	23.8	-
	No	96	76.2	

Table 1 reveals a predominantly male farming population (63.5%) with an average age of 45 years, suggesting a matured and experienced workforce. This aligns with broader trends in Nigeria, where male-headed households dominate rural agriculture. However, the proportion of male farmers in this sample is lower than the 84.34% reported in a study on multidimensional poverty among smallholder farmers (Arowolo & Ayinde, 2021). Majority of farmers are married (71.4%), this aligned with high marriage rates in rural Nigeria (80.26%) in Arowolo & Ayinde, 2021, households average six members, slightly below the national rural average of seven. This smaller household size may influence labour availability and consumption patterns, as larger households often provide more family labour but also increase food demand (Mohammed *et a*l, 2016 as cited in Koledoye, 2024).

Educational attainment is moderate, with 35.7% of farmers having secondary education, 31.7% primary education, and 19.8% lacking formal education. This educational profile is significant, as studies indicate that education enhances the adoption of modern farming techniques and improves food security (Ayinde & Adewumi, 2021). The primary crops cultivated are cassava (35.7%) and maize (31.7%), which are staple crops in Nigeria, aligning with findings that smallholder farmers are key contributors to food production despite low yields for these crops (Ogunniyi & Oyekale, 2022). The average farm size of 1.61 hectares is typical for smallholder farmers, who generally cultivate less than 2 hectares, reflecting the subsistence nature of their operations. The reliance on family labour (47.6%) and minimal use of mechanized labour (7.9%) further emphasizes the labour-intensive nature of these farms. With a mean farming experience of 12 years and 32.5% having over 15 years of experience, these farmers possess substantial local knowledge, which could be leveraged through targeted training and extension services to improve productivity. However, the lack of mechanization and small farm sizes limit their ability to scale operations, a challenge compounded by restrictive land tenure systems that hinder land acquisition (Ogunniyi & Oyekale, 2022).

Economically, the farmers in Table 1 face significant challenges, with an average annual farm income of ₦254,761.90, and 39.7% earning between ₦100,000 and ₦300,000. This low income reflects the broader issue of poverty among smallholder farmers, as evidenced by a multidimensional poverty index (MPI) of 0.27 for arable crop farm households in Nigeria, with an average poverty intensity of 0.45 (Arowolo & Ayinde, 2021). Factors such as household location, gender, and non-farm income are negatively correlated with poverty, while the age of the household head and access to extension services can increase poverty levels, possibly due to inadequate or poorly targeted services. Institutional support is notably limited, with only

31.7% of farmers having access to credit facilities and 68.3% lacking such access. This low access to credit hampers their ability to invest in farm inputs, such as fertilizers or improved seeds, which are critical for enhancing productivity. Similarly, only 23.8% of farmers report access to government support, indicating a significant gap in public agricultural intervention. This aligns with findings that government investment in agriculture is insufficient, with an Agriculture Orientation Index (AOI) of less than 1, reflecting low prioritization of the sector (Ogunniyi & Oyekale, 2022). Membership in farmers' associations is relatively common (55.6%), which may provide access to shared resources and information, but the low ownership of farming equipment (39.7%) and reliance on family labour highlight the lack of mechanization and modern tools. The economic constraints are further worsened by limited access to markets and financial services, a common issue among smallholder farmers in Nigeria. For instance, only 35.4% of farmers use inorganic fertilizers, and 20.7% participate in extension services, indicating underutilisation of modern agricultural inputs and support systems (Ogunniyi & Oyekale, 2022). These challenges contribute to low productivity and food insecurity, with studies showing that 23.2% of smallholder maize farming households experience food insecurity, influenced by factors such as education, access to credit, and participation in government programmes (Ayinde & Adewumi, 2021).

The socio-economic profile of the smallholder farmers in Table 1 depicts a picture of a resilient and experienced group hindered by structural barriers. The small farm sizes, low level of mechanization, and limited access to credit and government support restricted their ability to boost productivity and lift themselves out of poverty. These findings align with wider research indicating that smallholder farmers in Nigeria face systemic challenges, including limited access to financial credit, markets, and agricultural inputs, which lead to declining yields for key crops like cassava and maize (Ogunniyi & Oyekale, 2022). The moderate educational attainment and considerable farming experience suggested potential for progress if these farmers receive targeted support. The high rate of membership in farmers' associations (55.6%) presents an opportunity for collective action, such as cooperative purchasing of inputs or sharing of equipment, which could mitigate some of the economic and resource constraints. However, reforming restrictive land tenure systems could allow farmers to access larger plots, potentially increasing economies of scale. Such interventions could enhance the livelihoods of smallholder farmers and support Nigeria's broader food security and economic development goals, recognizing their vital given their role in food production.

Table 2. Distribution of farmers based on their accessibility and utilization of OGADEP's Extension services.

Statement	SD	D	N	A	SA	Mean	Std. Dev.
I have access to OGADEP's extension services	10 (7.9%)	20 (15.9%)	30 (23.8%)	50 (39.7%)	16 (12.7%)	3.34	1.14
OGADEP's extension agents visit my farm regularly	15 (11.9%)	25 (19.8%)	35 (27.8%)	40 (31.7%)	11 (8.7%)	3.06	1.16
I receive training on modern farming techniques	12 (9.5%)	22 (17.5%)	32 (25.4%)	45 (35.7%)	15 (11.9%)	3.23	1.15
The extension services provided are timely	18 (14.3%)	28 (22.2%)	30 (23.8%)	40 (31.7%)	10 (7.9%)	2.97	1.19
The information provided is relevant	8 (6.3%)	15 (11.9%)	35 (27.8%)	50 (39.7%)	18 (14.3%)	3.44	1.08
I have attended an OGADEP-organized workshop	20 (15.9%)	25 (19.8%)	30 (23.8%)	35 (27.8%)	16 (12.7%)	3.02	1.25
OGADEP provides information on pest and disease control	10 (7.9%)	18 (14.3%)	30 (23.8%)	48 (38.1%)	20 (15.9%)	3.40	1.14

Extension agents provide demonstrations	12 (9.5%)	20 (15.9%)	35 (27.8%)	45 (35.7%)	14 (11.1%)	3.23	1.13
I receive information about improved seed varieties	8 (6.3%)	15 (11.9%)	32 (25.4%)	50 (39.7%)	21 (16.7%)	3.49	1.09
OGADEP services are easily accessible to all	20 (15.9%)	30 (23.8%)	35 (27.8%)	30 (23.8%)	11 (8.7%)	2.86	1.20
I have received advisory support on marketing	15 (11.9%)	25 (19.8%)	40 (31.7%)	35 (27.8%)	11 (8.7%)	3.02	1.15
OGADEP services have helped improve farm management	10 (7.9%)	18 (14.3%)	30 (23.8%)	48 (38.1%)	20 (15.9%)	3.40	1.14
The frequency of extension visits is adequate	18 (14.3%)	30 (23.8%)	35 (27.8%)	33 (26.2%)	10 (7.9%)	2.89	1.18
OGADEP provides useful weather and climate information	12 (9.5%)	20 (15.9%)	35 (27.8%)	45 (35.7%)	14 (11.1%)	3.23	1.13
I actively implement OGADEP recommendations	8 (6.3%)	15 (11.9%)	30 (23.8%)	50 (39.7%)	23 (18.3%)	3.52	1.10

Accessibility and Utilization of OGADEP's Extension Services

The data from Table 2 shows that smallholder farmers in Ogun State generally view OGADEP's extension services positively in terms of content relevance and usefulness. Farmers strongly agree that the information provided is relevant (mean = 3.44) and has significantly improved farm management practices (mean = 3.40). Key areas of strength include information on improved seed varieties (mean = 3.49) and pest and disease control (mean = 3.40), with a notable proportion of farmers actively implementing OGADEP's recommendations (mean = 3.52). These high mean scores along with standard deviations ranging from 1.08 to 1.25, suggest a generally positive response from farmers who access these services, with a moderate variation in opinions indicating some differences in experiences. This aligns with research indicating that extension services, when accessible, can significantly increase agricultural productivity and food security by providing farmers with practical knowledge (Ayinde & Adewumi, 2021).

However, the study also reveals critical challenges in service delivery. The frequency of extension visits is rated as inadequate (mean = 2.89), and the timeliness of services is slightly below neutral (mean = 2.97), indicating that farmers often do not receive support when it is most needed, such as during planting or harvesting seasons. Furthermore, the perception that OGADEP services are easily accessible to all farmers is low (mean = 2.86), highlighting potential barriers like as geographical isolation, limited awareness, or socio-economic constraints. These findings align with broader challenges in Nigeria's agricultural extension systems, where weak delivery mechanisms and limited reach are significant huddles (Ogunleye & Ogundele, 2023). For example, a study involving state Agricultural Development Programme (ADP) directors, including those from Ondo State, identified weak extension services as a key sectorial challenge, often worsened by poor coordination and resource constraints (Ogunleye & Ogundele, 2023).

The moderate ratings for attending OGADEP-organized workshops (mean = 3.02) and receiving advisory support on marketing (mean = 3.02) further suggest that while some farmers engage with these opportunities, others may face barriers to participation. Socio-economic factors, such as education levels or household size, may influence access, as research indicates that farmers with higher education are more likely to utilize extension services effectively (Arowolo & Ayinde, 2021). The reliance on personal contact methods, such as farm visits and group meetings, as noted in historical studies of Nigerian extension services, may also limit reach, particularly for farmers in remote areas. These challenges emphasize the need for targeted interventions to ensure that OGADEP's services are both accessible and timely for all farmers.

The challenges identified in Table 2 highlight systemic issues within Nigeria's agricultural

extension framework. A comprehensive study on national agricultural policies found that weak extension services remain a consistent barrier to agricultural growth, with state ADPs, including OGADEP, often facing difficulties in implementation and limited resources (Ogunleye & Ogundele, 2023). The study observed that policies such as the Agricultural Transformation Agenda (ATA) and Agricultural Promotion Policy (APP) underperformed in contributing to GDP (20.9% and 21.8%, respectively), partly due to inadequate extension support. Likewise, historical analyses have identified institutional factors, such as the lack of transport for extension agents and insufficient professional training, as barriers to effective service delivery. These findings indicated that OGADEP's challenges are of a wider- pattern of under-funded and poorly coordinated extension systems across Nigeria.

Furthermore, the low accessibility rating (mean = 2.86) may be connected to socio-economic disparities among farmers. Research shows that factors such as education, gender, and location significantly affect access to extension services, with less-educated or remote farmers often excluded (Arowolo & Ayinde, 2021). The moderate participation in workshops and marketing support also suggests that OGADEP's outreach light might not be reaching all farmers equally, potentially due to limited awareness or logistical issues. The wider literature also emphasizes the increasing importance of pluralism in Nigeria's extension services, with public-private partnerships and NGOs involvement offering opportunities to improve reach, but coordination remains a challenge (GFRAS, n.d.). This context highlights the need for OGADEP to address both structural and farmer-specific barriers to maximize its impact.

Table 3. Logit Regression Analysis on influence of OGADEP's Extension Services on Farmers' Productivity.

Variable	Coefficient	Std. Error	Z-value	P-value	Wald Chi-Square	Odds Ratio	Std. Coefficient
Constant	-7.80***	1.90	-4.11	0.000	16.89	0.0004	-
Crop Yield	0.68***	0.21	3.24	0.001	10.50	1.97	0.23
Improved Seeds	0.58***	0.20	2.90	0.004	8.41	1.79	0.20
New Techniques	0.48*	0.19	2.53	0.011	6.40	1.62	0.17
Farm Income	0.62***	0.20	3.10	0.002	9.61	1.86	0.21
Post-Harvest Losses	0.33	0.18	1.83	0.067	3.35	1.39	0.11
Diversified Activities	0.36*	0.18	2.00	0.046	4.00	1.43	0.12
Soil Management	0.55***	0.20	2.75	0.006	7.56	1.73	0.19
Modern Equipment	0.28	0.18	1.56	0.119	2.43	1.32	0.10
Pesticides Fertilisers	0.52***	0.20	2.60	0.009	6.76	1.68	0.18
Better Markets	0.31	0.18	1.72	0.085	2.96	1.36	0.10
Traditional Methods	0.50*	0.20	2.50	0.012	6.25	1.65	0.17
Farm Profitability	0.60**	0.20	3.00	0.003	9.00	1.82	0.20
Record keeping	0.38*	0.19	2.00	0.046	4.00	1.46	0.13
Climate Resilience	0.47*	0.19	2.47	0.013	6.10	1.60	0.16
Pseudo R-squared (R^2)	0.47						
Likelihood Ratio Chi-Square	104.62						

Log-Likelihood: -58.75 (indicating model fit compared to null model); **Pseudo R-squared**: 0.47 (indicating good explanatory power); **Likelihood Ratio Chi-Square**: 104.62 (df = 14, $p < 0.10$*), indicating the model is significantly better than a null model; **Significance Levels**: ** $p < 0.05$, *** $p < 0.01$.

The findings in Table 3, for the logit regression analysis clearly demonstrate that OGADEP's extension services significantly influence farmers' productivity in the study area. The model's robustness is indicated by a Pseudo R-squared value of 0.47 and a Likelihood Ratio Chi-Square of 104.62 ($p < 0.001$), suggesting that nearly half of the variation in productivity can be attributed to the variables included in the model. Among these, crop yield, improved seed adoption,

farm income, the use of pesticides and fertilizers, and the application of new farming techniques emerged as the most influential factors, all showing statistically significant positive coefficients ($p< 0.01$). These findings align with the work of Asres *et al.* (2020), who observed that the uptake of improved seed varieties and the dissemination of agronomic knowledge through extension services significantly boosted maize yields in Ethiopia. Similarly, Abegunde and Edewor (2021) documented that targeted extension activities increased farm income and productivity in southwestern Nigeria, highlighting the practical value of tailored outreach strategies.

Additionally, the influence of soil management ($p< 0.01$), record keeping ($p<0.05$), and climate resilience ($p< 0.10$) as statistically significant factors suggest that OGADEP's training and awareness campaigns extend beyond production-focused assistance to include long-term sustainability and resilience building. This aligns with global best practices, as documented by Kassie *et al.* (2020), who argue that modern extension services must integrate environmental and business-oriented training to be effective in an era of climate change. The positive but statistically non-significant coefficients for variables like post-harvest loss reduction, use of modern equipment, and access to better markets still suggest a latent impact and highlight areas where OGADEP could strengthen its efforts. For example, Mbanaso and Okonkwo (2019) found that limited access to post-harvest facilities and mechanization services reduced the efficiency of extension outcomes in Nigeria's southeast, calling for improved logistics and infrastructure support.

Furthermore, the adoption of traditional methods, surprisingly showing significance ($p< 0.10$), may imply that OGADEP is not only introducing modern innovations but also helping farmers optimize existing practices a form of hybrid knowledge integration observed in successful programmes in Kenya and India (Singh & Aggarwal, 2018). The fact that Farm profitability ($p = 0.003$) significantly influenced corroborates the assertion by Oladele and Sakagami (2022) that well-structured extension systems directly contribute to improved livelihoods through better decision-making and increased economic returns. Overall, the analysis supports the view that effective extension services are multidimensional, affecting technical capacity, economic viability, and farmers' behaviour. It reaffirms the vital role of public agricultural extension agencies like OGADEP in attaining sustainable rural development, particularly when interventions are well-funded, farmer-centered, and diversified to address a broad range of productivity challenges.

CONCLUSION

This study concludes that although smallholder farmers in the Ijebu-Ode Agricultural Zone possess considerable farming experience and modest education, their productivity remains hindered by limited credit access, poor mechanization, inadequate government support, and unequal access to extension services. While OGADEP's extension services are relevant and beneficial, their effectiveness is weakened by infrequent visits and poor accessibility. To address these issues, the study recommends expanding OGADEP's outreach through more extension agents and timely service delivery, establishing accessible credit schemes, supporting mechanization initiatives, and promoting cooperative formation among farmers. It also advocates for regular workshops, mobile and ICT-based extension platforms, increased government investment, and stronger institutional collaboration. Additionally, integrating weather and market advisories into extension services is essential for enhancing decision-making and improving farm productivity.

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