

IMPACT OF AGRICULTURAL EXTENSION SERVICES ON THE PRODUCTIVITY OF SMALLHOLDER FARMERS AS RURAL SMES IN THE SOUTHERN ZONE OF NASARAWA STATE.

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Abstract

This study investigates the impact of agricultural extension services on the productivity of smallholder farmers, viewed as rural SMEs, in the southern zone of Nasarawa State, Nigeria. Smallholder farmers dominate Nigeria's agricultural sector, yet their productivity remains low due to limited access to modern knowledge, technology, and markets. Extension services are globally recognized as a catalyst for rural transformation, but their effectiveness in Nasarawa State remains underexplored. Motivated by the urgent need to strengthen food security, diversify the economy beyond oil, and reduce rural poverty, this study examines how extension services contribute to smallholder productivity and local economic development. A survey research design was adopted, with data collected through structured questionnaires administered to 384 small-scale farmers selected via multi-stage random sampling. The Cochran formula guided the determination of the sample size, given the absence of a comprehensive farmer registry. Ordinary Least Squares (OLS) regression was employed to assess the effects of farmers' awareness of extension services, the quality of technical and advisory support, and barriers to access. Findings reveal limited outreach of awareness programs, significant positive impacts of technical services, and mixed outcomes of advisory support. The study recommends capacity strengthening, digital integration, and tailored advisory reforms to position smallholders as viable SMEs driving productivity, finance access, and food security in Nasarawa State.

KEYWORD: Agricultural Extension Services, Productivity, Development, Small Holder Farmers, SMEs.

JEL Classification: E31, I32, H53

Introduction

Globally, agriculture remains critical for poverty reduction and economic growth, serving as the main income source for approximately 2.5 billion people in developing countries (Food and Agricultural

Organization of the United State, 2018). Agriculture has historically been fundamental to Nigeria's economic development, serving as a precondition for industrial advancement and a major source of employment and livelihood. However, the discovery and exploitation of oil shifted the nation's focus, leading to the neglect of the agricultural sector due to inappropriate policies and underinvestment. (Adeyemi & Abiodun, 2013). Despite renewed government efforts to revamp agriculture, the sector's productivity remains low compared to global standards, largely due to inadequate public spending, mismanagement, and limited private investment in agriculture (Alkali, 2017; Humbert, 2010).

Nevertheless, According to central bank of Nigeria's report (CBN 2016), agriculture continues to be the backbone of Nigeria's rural economy, providing entrepreneurial opportunities and employment for the majority of the population, mostly at the subsistence level (CBN, 2016). In Nigeria, agricultural growth is vital for achieving inclusive economic development and food security since rural households largely depend on farming and related activities.

To increase agricultural productivity and rural incomes, agricultural extension services are essential. These services function as important channels for delivering new agricultural knowledge, technologies, and advisory support to farmers (Nwaobiala, 2017). In rural Nigeria, extension services aim to modernize farming practices, boost yields, and enhance the entrepreneurial capacity of farmers. A carefully implemented agricultural extension system helps transform traditional smallholder farming into productive, market-oriented, and profitable rural micro and small enterprises (SMEs). Such transformation contributes to rural wealth creation, employment, and local economic development. Extension services not only transfer improved agricultural technologies but also link farmers to markets, help secure microloans, and build managerial capacity, which are all vital for positioning smallholder farmers as viable rural SMEs. Although provision of extension services has long been on Nigeria's policy agenda, their effectiveness has often fallen short due to various implementation challenges (Agbamu, 2015).

Agriculture is a key driver of Nasarawa State's economy, with a large proportion of the population engaged in small-scale farming for subsistence and income generation. Smallholder farmers in the state operate as rural SMEs, contributing significantly to local food supply, employment, and poverty reduction. However, agricultural productivity in Nasarawa State remains below its potential due to constraints such as limited access to modern inputs, poor irrigation facilities, soil degradation, and climate variability (Nasarawa state Agricultural Development Project, 2020). Farming continues to be

dominated by traditional practices with minimal adoption of modern innovations that can maximize output and strengthen farmers' capacity as viable rural businesses (Arokoyo, 2012).

While the Nasarawa State government has implemented various intervention programmes, including Ba Dakoshi and Fadama III, productivity remains low compared to national benchmarks of averages approximately 3.9 metric tonnes per hectare (Swanson, 2014). This persistent underperformance threatens food security and economic stability, limits rural income growth, and contributes to rural-urban migration as farming becomes less viable.

Extension services in Nasarawa State are intended to bridge these gaps by providing farmers with relevant training, technology transfer, and advisory support to improve productivity and strengthen their roles as rural SMEs. Research shows that well-designed extension services can increase farm yields by 15–20% through better farm management and technology adoption (Anderson & Feder, 2014). However, as reviewed under empirical studies there is no specific study that examine how extension services affect the productivity of smallholder farmers as rural SMEs in the state.

Against this background, this study investigates the impact of agricultural extension services on the productivity of smallholder farmers as rural SMEs in the southern zone of Nasarawa State. The study assesses farmers' awareness of available extension services, the impact of technical and advisory support on farm output, and the barriers limiting smallholder farmers' access to these services. The study is focused on selected local government areas in Nasarawa South Zone which include Lafia, Obi, and Doma to provide evidence that can inform policy interventions aimed at strengthening smallholder farmers' productivity and capacity as rural SMEs. The study addresses the following research questions:

- i. What is the level of awareness of agricultural extension services among small-scale farmers in southern zone of Nasarawa State?
- ii. To what extent does the technical extension services impact the output of small-scale farmers in southern zone of Nasarawa State?
- iii. What is the impact of advisory extension services on the output of small-scale farmers in southern zone of Nasarawa State?
- iv. What are the barriers faced by small-scale farmers in accessing extension services?

2.0 Empirical Review

Several empirical studies have examined the factors influencing agricultural productivity and the effectiveness of extension services in similar contexts which include that of Alakpa and Ehigie (2024) evaluated the efficacy of extension service delivery on farmers' socio-economic attributes using a multi-stage sampling methodology with 300 farmers. Using descriptive statistics and logit regression analysis, they found a gender distribution of 55% males and 45% females, with 53.3% aged 41-50 years (mean age 43 years). The majority (72.7%) were married with an average farm size of 3 hectares. Over half expressed ambivalence regarding extension workers' professionalism (59.7%) and information reliability (62.0%). Regression analysis revealed that age, educational attainment, and household size significantly correlated with extension service effectiveness ($P < 0.05$). The study recommended periodic training for extension agents to remain current with latest techniques and methodologies.

Moreover, Adefalu et al. (2023) assessed the comparative impact of traditional versus modern agricultural extension practices on small-scale farmers' productivity in Nigeria. Using surveys across three states with structured questionnaires and focus group discussions, they found modern extension services, particularly digital platforms, more effective than traditional methods. Farmers under digital programs experienced 15% yield increases compared to 10% under traditional programs, attributed to better real-time information access and frequent agent interactions. They recommended scaling up digital extension services and investing in training agents to utilize modern digital tools.

In the same country, Oyediran et al. (2022) examined extension services' impact on agricultural productivity among smallholder farmers using descriptive statistics and regression analysis. Results showed extension services significantly improved agricultural productivity, with farmers receiving services achieving higher yields than those without. They recommended increased government funding for agricultural extension and enhanced farmer-extension agent interaction.

In addition, Harrison (2021) determined agricultural extension service delivery impact on cassava production in Kwami local government area, Gombe State, using 105 respondents (93 cassava farmers, 12 extension agents) through simple random sampling. Using a four-point scale structured questionnaire validated by experts and tested for reliability, findings revealed that poor soil fertility influenced cassava production, while farmers benefited from agricultural extension agents. The study recommended employing more extension agents for sufficient service coverage.

Also, Shikuku et al. (2021) explored digital extension services effectiveness in enhancing smallholder farmers' productivity in Tanzania through a randomized control trial involving 600 farmers. Using difference-in-differences analysis, they found treatment group farmers receiving digital services via mobile phones experienced significant yield increases compared to control groups. They recommended scaling up digital extension services and integrating them with traditional methods.

A study by Ojiagu and Onwumere (2021) assessed agricultural extension services' impact on rice farmers' productivity in Ebonyi State, Nigeria, surveying 300 farmers using descriptive statistics and stochastic frontier analysis. Farmers with extension access were more technically efficient with higher yields than those without. Education level and extension visit frequency positively influenced productivity. They recommended increasing extension agent numbers and improving training effectiveness.

Moreover, Ashraf et al. (2021) evaluated extension services' role in improving smallholder vegetable farmers' productivity in Khyber Pakhtunkhwa, Pakistan, surveying 320 farmers using descriptive statistics and two-stage least squares regression. Farmers with regular extension access reported higher vegetable farming productivity and better farm management practices. They recommended enhancing extension services reach, particularly in remote areas, and providing specialized vegetable farmer training.

Nganga et al. (2020) assessed agricultural extension services' impact on small-scale maize farmers' productivity and income in Embu County, Kenya, surveying 250 farmers using descriptive statistics and multiple regression analysis. Extension services significantly positively affected maize yields and household income, with visit frequency and advice quality being key factors. They recommended enhancing extension worker capacity through regular training and increasing visit frequency for timely, relevant advice.

Amare et al. (2020) evaluated agricultural extension services effectiveness in improving smallholder farmers' productivity in Ethiopia's Oromia region using propensity score matching with 600 farmers. Farmers receiving extension services had significantly higher yields and improved knowledge of agricultural practices compared to those without. They recommended expanding extension services reach, particularly in remote areas, and increasing training session frequency.

Khan et al. (2020) assessed agricultural extension services' impact on high-yield variety seed adoption among smallholder wheat farmers in Punjab, Pakistan, surveying 400 farmers using probit regression

analysis. Extension services access significantly increased HYV seed adoption probability, with regular contact and farmer field school participation being critical factors. They recommended expanding farmer field schools and increasing extension worker-to-farmer ratios for greater technology adoption.

From the reviewed empirical studies, most research was conducted outside Nigeria in countries such as Tanzania (Shikuku et al., 2021), Pakistan (Ashraf et al., 2021; Khan et al., 2020), Kenya (Nganga et al., 2020), and Ethiopia (Amare et al., 2020), covering broader regional contexts. While Nigerian studies exist, they were narrowly focused within single local governments such as Kwami LGA in Gombe State (Harrison, 2021) or single states like Ebonyi State (Ojiagu and Onwumere, 2021), with only Adefalu et al. (2023) covering three states. Notably, no studies specifically assessed extension services' contribution to small-scale farmers' output in Nasarawa State's Southern Zone. This study aims to fill these gaps and add knowledge to available research in this area.

3.0 Methodology

The main research approach adopted for the study was a survey design, in which questionnaires were administered to farmers so as to collect data relevant to the study. This study adopted multi-stage random sampling. First stage involved a random selection of three local governments areas in Nasarawa South out of five, random selection of three (3) villages each from the three local governments will be used to give a total of twenty (9) villages.

The population of the study cannot be ascertained easily due its large size and cut across different categories of farmers. Therefore, Cochran formula was adopted to determine the sample size. This approach is justified because the exact number of small-scale farmers in the state is not documented in official records. Using a sampling method for unknown population size eliminates the need for precise population figures while still ensuring statistical validity.

Furthermore, relying on registered farmer populations could potentially introduce selection bias, as those formally registered might already have greater awareness of and access to extension services. This would undermine the study's objective of assessing the true impact and reach of extension services among the broader farming community. The Cochran formula helps mitigate this bias by allowing for a more diverse and representative sample.

$$n_0 = \frac{Z^2 Pq}{e^2}$$

Where:

e = is the desired level of precision

p = the estimated proportion of the population

q = 1p.

$$n_o = \frac{Z^2 Pq}{e^2}$$

Z = 1.96 (Gotten from Z-table)

p = 0.5

q = 1p

e = 0.05

q = 1p = 10.5 = 0.5

$$n = \frac{1.96^2 (0.5) (0.5)}{(0.05)^2}$$

$$= \frac{3.8416 \times 0.5 \times 0.5}{0.0025}$$

$$= 384.16$$

n = 384 respondents would provide a statistically valid sample for this study.

Table 3.1 Sample of Farmers in the Study areas

Southern Zone	Selected LGAs	Selected Villages	No. of Respondents
	Doma	Doma	70
		Rukubi	40
		Burumburum	31
	Obi	Obi	52
		TudunAdabu	40
		Daddere	30
	Lafia	Shabu	41
		Akurba	45
		Adogi	35
	Total	9	384

Author's computation

3.1 Model Specification

Multiple regressions model was used to ascertain the role of agricultural extension services on farmer's output in southern zone of Nasarawa state. The multiple linear regression model was formulated to capture the relationship between the agricultural extension services and farmer's output during the period under review. Variables included in the model are; Output of small scale farmers (OTP),

Technical Extension Service (TES), Advisory Extension Service (AES) and Level of Awareness of Extension Service (LAES).

The model was estimated as:

$$Y_i = \beta_0 + \beta_1 X + \beta_i Z_i + \varepsilon_i \dots\dots\dots 3.1$$

$$OTP = B_0 + B_1 LAES_i + B_2 TES_i + B_3 AES_i + \varepsilon_i \dots\dots\dots 3.2$$

Where:

OTP = Output of Small Scale Farmers

LAES = Level of Awareness of Extension Service

TES = Technical Extension Service

AES = Advisory Extension Service

ε_i = Error term

This research employed OLS to ascertain the role of the specified agricultural extension services above (which are the independent variables) on output of small-scale farmers in Nasarawa state Nigeria; Output is regarded as the dependent variable.

4.0 Result and Discussion of Findings

The researcher distributed four hundred (384) copies of 5 point Linkert scale questionnaires to the respondents and successfully recovered three hundred and fifty-six (356) duly completed. This shows a response rate of 89% and found to be valid for further analysis and computation.

Table 4.1: Socio-Demographic of the Respondents

GENDER	Frequency	AGE	Frequency
Male	236	Below 20 years	39
Female	120	21-30 years	96
		31-40 years	100
		41-50 years	80
		51-years and above	41
Total	356		356

Source: Field Survey, 2024; Computed with SPSS 25

The distribution of the respondents based on Gender in Table 4.1 showed that both male and female were represented in the sample, with male respondents being 236 (66.3%) and females 120 (33.7%). With regard to age, the results showed that the distribution of the respondents based on age. Out of the total respondents, (10.95%) were below or 20 years, 96 (26.95%) were between 21-30 years while 100 (28.06%) were between 31-40 years. then 80 (22.49%) were between 41 years and above. This finding revealed that the majority of the respondents were youth and active, having their age below 30 years.

Table 4.2: How Long Have you been Engaged in Farming?

Years	Frequency	Percent	Valid Percent	Cumulative Percent
Less than a year	35	9.8	9.8	9.8
From 1 to 5 years	121	34.0	34.0	80.6
from 6 to 10 years	98	27.5	27.5	92.7
Above 10 years	102	28.7	28.7	100.0
Total	356	100.0	100.0	

Source: Field Survey, 2024; Computed with SPSS 25

Table 4.3: Overall Yes or No Questions on Agricultural Extension Services Awareness

Responses	Frequency	Percentage%
Yes	282	79.20
No	74	20.73
Total	356	100.0

Source: Field Survey, 2024; Computed with SPSS 25

The data above reveals a high level of awareness of agricultural extension services among respondents, with 79.20% indicating they are informed about these resources, which reflects effective communication and outreach efforts.

Table 4.4: Awareness of Extension Services

Items	Statements	SD(%)	DA(%)	N(%)	A(%)	SA(%)
AES1	I am aware that agricultural extension services are available in my community.	6.5	10.7	11.1	45.3	26.4
AES2	I know the agricultural extension workers in my area.	5.9	18.8	10.4	30.9	34.0
AES3	I understand the role of agricultural extension workers.	5.2	3.1	10.4	29.2	52.1

Source: Field Survey, 2024; Computed with SPSS 25

Table 4.5: Services Received from Agricultural Extension Workers

Services	Frequency	Percentage%
Crop production advice	30	10.64
Pest and disease control	50	17.73
Livestock management	38	13.48
Irrigation techniques	15	5.32
Soil testing	5	1.77
Use of modern farming equipment	37	13.12
Post-harvest management	41	14.55
Marketing and market access	20	7.09

Financial or credit advice	46	16.34
Others	0	0.0
TOTAL	282	100

Source: Field Survey, 2024; Computed with SPSS 25

Table 4.6: Technical Extension Services

Items	Statement	SD(%)	DA(%)	N(%)	A(%)	SA(%)
TES1	The guidance on the use of modern farming equipment has been practical and useful.	7.3	11.5	8.3	47.6	25.3
TES2	The technical advice provided by extension workers has improved my agricultural productivity	5.2	7.3	8.3	36.5	42.7
TES3	The training programmes provided by extension workers have been relevant to my farming needs.	5.6	5.1	17.1	33.7	38.5
TES4	I have gained valuable skills and knowledge from the demonstration sessions organized by extension workers.	4.8	15.2	27.5	25.0	27.5
TES5	The topics covered in training sessions I attended are relevant to the challenges I face on my farm.	4.3	2.5	8.4	42.7	42.1
TES6	The guidance provided on pest and disease control has been helpful to me.	5.9	9.3	6.7	38.5	39.6
TES7	communication methods used by extension workers are effective	4.2	5.9	6.7	48.6	34.6

Source: Field Survey, 2024; Computed with SPSS 25

Table 4.7: Advisory Extension Services

Items	Statement	SD(%)	DA(%)	N(%)	A(%)	SA(%)
ADE1	The advice provided on crop management practices has been helpful.	6.5	6.2	17.1	32.6	38.0
ADE2	The advisory services on pest and disease management have improved my farm's productivity.	4.8	9.6	14.0	44.1	27.5
ADS3	The advisory services related to post-harvest handling are very relevant.	42.1	21.6	8.4	23.6	4.2
ADS4	The financial or credit-related advice I received from the extension workers has been useful for my farming activities.	25.0	38.5	20.5	9.3	6.7

ADS5	The advisory services have helped me make informed decisions about my farming practices.	4.2	25.6	34.5	29.0	6.7
ADS6	Overall the advisory services provided by agricultural extension workers are relevant to my specific needs as a farmer.	19.9	13.4	13.4	13.1	40.2
ADS7	I believe the advisory services have contributed to the sustainable development of my farming activities.	13.4	13.4	19.9	26.8	26.5

Source: Field Survey, 2024; Computed with SPSS 25

Table 4.8: Challenges Faced by Small Scale Farmers in Accessing Extension Services

Challenges	Frequency	Percentage%
Distance to extension offices	103	28.94
Lack of timely information	178	50.00
Limited access to extension workers	50	14.04
Language barriers	25	7.03
TOTAL	356	100.00

Source: Field Survey, 2024; Computed with SPSS 25

Table 4.9: Regression Results

Coefficients ^a					
Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	.115	.090		1.271	.204
AES	.123	.044	.159	3.245	.001
TES	.221	.078	.695	10.569	.000
ADS	.551	.083	.565	-7.864	.000
R	R Square		Adjusted R Square		
.773 ^a	.707		.766		

Source: Field Survey, 2024; Computed with SPSS 25

The regression analysis examines the impact of different types of extension services on farmers' output in the southern zone of Nasarawa state. The results using standardized coefficient reveal several significant findings regarding the relationship between extension services and agricultural productivity. The analysis demonstrates that all three independent variables - Awareness of Extension Services

(AES), Technical Extension Services (TES), and Advisory Extension Services (ADS) - are statistically significant at $p < 0.01$, while the constant term shows no statistical significance ($p = 0.204$).

Looking at the individual effects, Awareness of Extension Services (AES) shows a positive coefficient of 0.123, indicating that a one-unit increase in awareness leads to a 0.123-unit increase in farmer output. While significant, AES has the smallest standardized impact (Beta = 0.159) among the three variables. Technical Extension Services (TES) demonstrates a stronger influence with a coefficient of 0.221, meaning that a one-unit increase in technical services results in a 0.221-unit increase in output. Notably, TES exhibits the strongest standardized impact with a Beta value of 0.695. Advisory Extension Services (ADS) shows the highest direct coefficient of 0.551, indicating that a one-unit increase in advisory services leads to a 0.551-unit increase in output, with the second strongest standardized impact (Beta = 0.565).

The analysis conclusively shows that the two types of extension services including awareness positively and significantly impact farmer output, though with varying degrees of influence. Advisory Extension Services demonstrates the largest direct effect, while Technical Extension Services shows the strongest overall impact when variables are standardized. Although Awareness of Extension Services has a comparatively smaller impact, it remains statistically significant and contributes positively to farmer output.

The R column represented the coefficient of correlation amongst the dependent and independent variables. The value of .773 was reported high, which indicated that there is a high degree of association amongst the variables in this study. Furthermore, R^2 (R-Square) value of .707 was reported. It showed that 70% of the variation in dependent was explained by the extension services identified in this study. The remaining unaccounted 30% could be explained by other factors of extension services, which were not identified in the present study.

4.1 Discussion of Findings

The study examined the impact of extension services on small-scale farmer agricultural outputs in the southern zone of Nasarawa state. The findings revealed varying degrees of effects across different extension service dimensions, which can be attributed to several underlying factors.

The analysis of Awareness of Extension Services (AES) demonstrated the smallest but significant impact on farmer output ($\beta = 0.123$, $p < 0.001$). The relatively lower impact could be attributed to several factors. First, while 71.7% of respondents were aware of agricultural extension services, the

17.2% who remained unaware might be due to inadequate outreach programmes, communication barriers, or geographical isolation of some farming communities. The finding that 24.7% were unfamiliar with extension workers in their area suggests possible understaffing of extension personnel or irregular visits to certain communities. However, the high understanding of extension workers' roles (81.3%) among those aware indicates that when awareness programs are successfully implemented, they effectively communicate the purpose and potential benefits of extension services. This suggests that the lower impact might not be due to the quality of awareness programs but rather their reach and consistency. This aligns with Alakpa and Ehigie (2024), who found that over half of their respondents expressed ambivalence about the professionalism of extension workers (59.7%) and the reliability of their sources of information (62.0%). Similarly, Ajala (2013) noted that while awareness of agricultural extension technologies was high, the level of utilization was moderate, indicating that outreach and consistency of extension services remain critical challenges.

Technical Extension Services (TES) emerged as having the strongest standardized impact on farmer output ($\beta = 0.221$, Beta = 0.695, $p < 0.000$). This strong positive influence could be attributed to several factors. The practical, hands-on nature of technical services makes them more immediately applicable and relevant to farmers' daily operations. Technical services often provide tangible solutions to specific farming challenges, making their impact more measurable and apparent. Additionally, the high impact might reflect the quality of technical training received by extension workers and their ability to effectively transfer this knowledge to farmers. The standardized impact being the highest suggests that improvements in technical service delivery consistently lead to better farming outcomes across different farmer groups.

Advisory Extension Services (ADS) showed the highest direct coefficient ($\beta = 0.551$, $p < 0.000$), but with varying effectiveness across different aspects. The high satisfaction with crop management (70.6%) and pest/disease management advice (71.6%) could be attributed to extension workers' strong technical knowledge in these traditional areas, the immediate visibility of results when such advice is implemented, regular updating of knowledge in these fundamental areas, and clear alignment with farmers' primary concerns. However, the poor reception of post-harvest handling advisory services (63.7% dissatisfaction) might be due to limited infrastructure for post-harvest handling in the region, insufficient training of extension workers in modern post-harvest techniques, mismatch between advised practices and available resources, and limited market linkage support to make post-harvest practices economically viable. This finding is consistent with studies such as Oyediran et al. (2022), which demonstrated that farmers who received technical extension services experienced significantly

higher yields than those without. Similarly, Ojiagu and Onwumere (2021) found that access to technical extension services positively influenced rice farmers' efficiency and productivity in Ebonyi State, while Amare, Asfaw, and Shiferaw (2020) established that technical extension services led to significant improvements in farm productivity in Ethiopia. These studies reinforce the notion that practical, hands-on extension services play a vital role in improving agricultural output and should be prioritized.

The low satisfaction with financial and credit-related advice (63.5% dissatisfaction) could be explained by extension workers' possible limited expertise in financial matters, complex financial systems that are difficult to navigate, limited availability of agricultural credit facilities, and disconnect between financial advice and the economic realities of small-scale farmers. The mixed response to decision-making support (63.3% positive, 29.8% neutral/negative) might reflect varying capacity of extension workers to provide contextualized advice, different levels of farmer experience and need for decision support, complexity of agricultural decision-making in changing climate conditions, and diverse farmer needs that may not be uniformly addressed. The low satisfaction with financial and credit-related advice (63.5%) aligns with findings from Khan et al. (2020), who observed that while extension services positively influenced the adoption of high-yield variety seeds, financial advisory components remained weak due to limited access to agricultural credit facilities. Furthermore, the mixed response to decision-making support (63.3% positive, 29.8% neutral/negative) reflects the observations of Shikuku et al. (2021), who highlighted the variability in extension workers' ability to provide tailored advice to diverse farmer needs.

Based on the findings, the following recommendations are made to strengthen the productivity and development of smallholder farmers as rural SMEs:

- i. **Strengthen Technical Capacity:** Policymakers should invest in systematic training and regular evaluation of extension workers to ensure consistent delivery of high-quality technical support. This will enhance farmers' productivity and build their capacity as competitive rural SMEs.
- ii. **Expand Awareness and Outreach:** Government and stakeholders should improve the reach and consistency of awareness programs through regular practical demonstrations, farmer field schools, mobile extension units, and community volunteers, ensuring that all smallholder farmers even in remote areas are reached effectively.

- iii. Reform Advisory Services: Advisory extension services should be better tailored to farmers' evolving needs, including post-harvest handling, market linkages, and financial literacy. This will help farmers reduce losses, add value to their produce, and strengthen their viability as micro and small enterprises.
- iv. Leverage Digital Tools: A mobile-based extension platform should be developed to deliver real-time information on weather, pest control, and farm management directly to farmers' phones in local languages. Community digital hubs should complement this by providing access to detailed resources, virtual consultations, and connections to financing opportunities, improving smallholders' readiness to access microloans and SME development finance.
- v. Promote Integrated Support: Extension services should be linked with other rural development initiatives such as microfinance schemes and market access programs to make smallholder farmers more bankable and attractive to development finance institutions.

By implementing these measures, smallholder farmers in Nasarawa State's southern zone can be empowered to grow as productive rural SMEs that contribute meaningfully to local economic growth and food security.

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