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Effectiveness of extension services delivery on farmers' socio-economic characteristics in Esan Southeast and Esan Central Local Government Areas of Edo State, Nigeria

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ABSTRACT

The position of extension service(s) delivery in enhancing farmer's knowledge, skills, as well as technology dissemination cannot be overemphasized. This study was carried out in Edo state, Nigeria, with the aim of assessing the effectiveness of extension service(s) delivery on farmers' socio-economic characteristics. A multi-stage sampling technique was used to arrive at the sample size of 300 farmers for the study. Structured questionnaire was used to elicit information from the respondents. The data gathered were analyzed using descriptive (frequency counts, mean, percentages) and inferential (Logit regression analysis) statistics. The descriptive statistics result reveals a sex distribution of 55% males and 45% females. More than half (53.3%) of the respondents fall within the 41–50 years age group, with a mean age of 43 years. Majority (72.7%) of the respondents were married, with an average farm size of 3 hectares. Additionally, the findings show that more than half of the respondents were indifferent about extension workers discharging their duties with high level of professionalism (59.7%) and the credibility of their information source (62.0%). Based on the regression analysis, age, educational attainment and household size had a significant relationship with effectiveness of extension service delivery (P< 05). This study concludes that age, educational attainment, household size influences the effectiveness of extension service delivery. It is therefore, recommended that extension agents should be trained occasionally in order to stay current with the most recent techniques and approaches for service delivery.

Keywords: Smallholder farmers; extension services; logit regression

INTRODUCTION

Agriculture is a vital sector in Nigeria, providing food security, employment and economic growth. However, agricultural productivity remains low because majority of the smallholder farmers relying on traditional methods of production. This could only be ameliorated by employing the services of trained extension workers that helps in information dissemination and teaching farmers on the new agricultural science-based innovations.

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Agricultural extension services play a crucial role in disseminating improved technologies and bridging the gap between research and farmers. The history of extension services in Nigeria dates back to the colonial era and after independence. It was expanded by the government through various agricultural programs and agricultural related institutions.

The goal of these governmental efforts was to transmit research findings, educate farmers, solve agricultural problems and promote technology adoption (Aderinto, Agbelemoge and Dada, 2017). Even with these efforts, extension services delivery system faced many challenges, which include underfunding, few trained agents relative to number of farmers, limited mobility, lack of working tools, women farmers lacking access and youth interest in agriculture is declining. Despite all the programmes, the performance of agricultural sector has continually fallen below expectation, and the output from the sector is not making significant impact on Nigeria's economy (Abudu, Momoh and Ameh, 2023).

In the same manner, there have not been adequate efforts by researchers to analyze the effectiveness of the extension approach in promoting farming practices (Abudu *et al.*, 2023). This has given rise to gap in knowledge which is negatively affecting the agricultural sector (Oguntade, Fatunmbi and Okafor, 2016). According to Umeh, Igwe and Anyim (2018), famers' effective contribution and participation in agricultural development depends on their ability to optimize the services of agricultural extension agents. The question therefore is to what extent does farmers consider the contribution and importance of the role extension services play towards agricultural development in Edo state.

The study, therefore, was designed to describe the socio-economic characteristics of the farmers in the study area; and identify the effectiveness of extension service delivery to production practices of respondents in the study area.

METHODOLOGY

Description of the Study Area

Edo State is located in the South-South agro - ecological zone of Nigeria, with Benin-city as its state capital. The state was formed in 1991 from the old Bendel state, it lies on latitude 05° 44′ N to 07° 34′ N and longitude 05° 04′ E to 06° 45′ E. It has a land mass of 19,794km^2 and is bordered to the North by Kogi State, to the East and South by Delta State, and to the West by Ondo State.

According to National Population Commission (2022), Edo state has a projected population of 4,777,000 with Esan Southeast Local Government Area having a projected population of 166,309 persons and Esan Central Local Government Area 155,500 persons.

The state has a tropical wet and dry or savanna climate with yearly temperature of 28.78°C (83.8°F) and it is -0.68% lower than Nigeria's averages. Edo typically receives about 183.49 mm (7.22 inches) of precipitation and has 265.91 rainy days (72.85% of the time) annually and at an elevation of 239.16 meters (784.65 feet) above sea level.

Farmers make up a majority of the state population. Agriculture thrives in the state because of its favorable ecological and climatic conditions, numerous agricultural goods such as yam, cassava, cocoyam, maize, millet, guinea corn, palm produce, and other food produce can be grown in the state.

This research was carried out in Esan Southeast and Esan Central Local Government Areas, Edo State, where the fertile soil and abundant water supply provide great opportunities

for livestock husbandry. Small farmers, marginal farmers, and agriculture laborers all benefit from arable crop production as a source of income and employment.

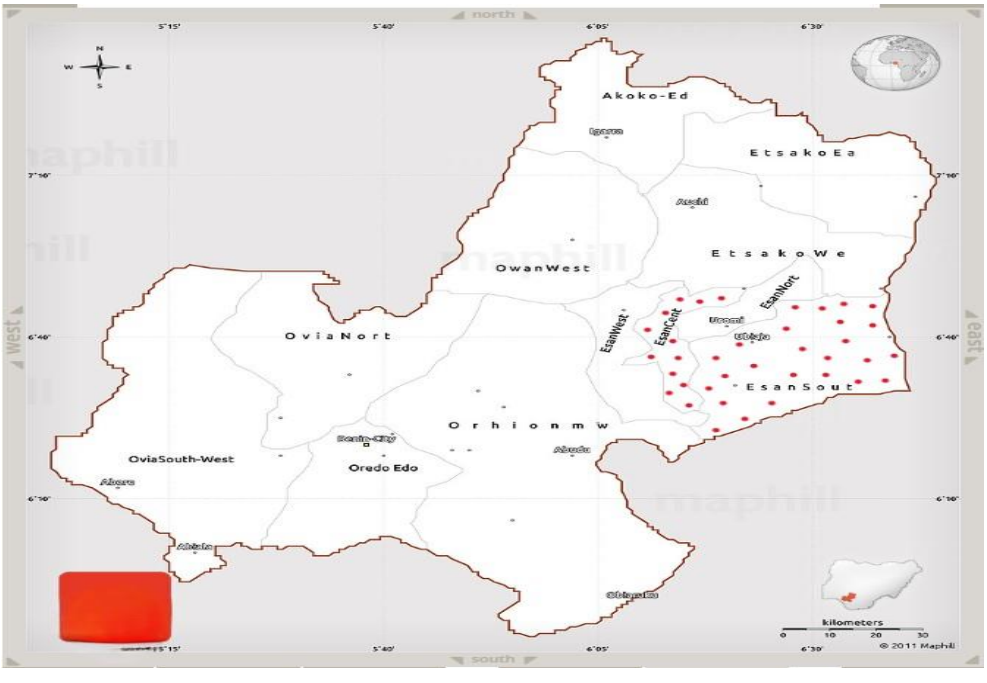

Fig: Map of Edo state, showing study area
Source: Map Graphics Revolution, 2013

Sampling Procedure and Sample Size

The target population for this study constituted the farmers of the two selected LGAs of Edo state, Nigeria, Esan South East and Esan Central Local Government Areas.

A multi-stage sampling technique was used for the selection of the respondents that were used for this study:

Stage 1: This involved the purposive selection of three (3) communities each that had active extension activities in the Local Government Areas for the study; this gave a number of six (6) communities. This selection was based on the list gotten from the Edo state ADP.

Stage 2: This involved a random selection of 30% of the farmers in each of the three communities, giving a sum of 170 respondents for Esan Southeast and 130 respondents for Esan Central, giving a total of three hundred (300) respondents for the study.

Data Collection

The primary data was obtained through the use of structured questionnaire and interview schedule. The secondary data was obtained from relevant literature works and existing publications.

Measurement of the Study Variables

1. Sex: This was measured nominally as Male and Female.
2. Age: Respondents were asked to indicate their age, it was scaled as < 40, 41 – 50, 51 – 60, >61.
3. Marital status: This was measured nominally as follows: Single, Married, Widowed, Divorced.
4. Household size: Respondents were asked to indicate the number of persons feeding from the same pot and living together, it was grouped as < 2, 3 – 4, 5 – 6, >7
5. Farm size in hectares: Respondents were asked to indicate their farm size, this was grouped as < 2, 3 – 4, > 5
6. Educational attainment: This was measured using nominal measurement scale: no education, primary education, secondary education and tertiary education.
7. Years of farming experience: Respondents were asked to indicate the number of years they had spent in farming. This was scaled as <10, 11 – 20, 21 – 30, > 31 years.
8. Monthly income in naira: This was scaled as <₦30000, ₦30001 - ₦50000, ₦50001 – 70000, ₦70001 - ₦90000, > 90001
9. Effectiveness of extension services delivery to respondents' production practice: This was measured by assessing the farmers perception on:
   i. extension workers' professionalism;
   ii. credibility of information source;
   iii. category of extension agents encountered;
   iv. methods employed in delivering extension services.

Data Analysis

Data obtained was analyzed using frequency counts, mean, percentages, logit regression and t-test.

Model Specification

The logit regression is given as:

$Pr(Y=1/Xi) = Ln[\frac{Yi}{1-Yi}] = a + b_iX_i + \ldots + b_7X_7 + U$ ……..equation 1

Where:

Ln = Natural log

Pr(Y=1/Xi) = Probability of Y occurring, given that Xi-Xn have occurred

A = the coefficient of the constant term

bi-bn = The coefficient of the independent variables

Xi-Xn = The independent variables

U = Error term

The mathematical expression of the model is explicitly specified as:

$Yi=b_0+b_1X_1+b_2X_2=b_3X_3+b_4X_4+b_5X_5=b_6X_6+b_7X_7+U$ ……equation 2

Where:

Yi = Extension service (significant effect=1; otherwise =0)

X_1 = Age (Number of years)
X_2 = Farming Experience (Years)
X_3 = Years of formal education attainment
X_4 = Household size (Number of persons living and feeding from same pot)
X_5 = Farm size (Hectares)
X_6 = Membership of Association (Yes=1, No=0)
X_7 = Frequency of annual visits to farmers (Number of visits to a farming household)
U = Error Term

RESULTS AND DISCUSSION

All 300 study instruments administered were retrieved and considered useful for data analysis. The subsequent sections are based on these responses which represent the results of the data analysis, followed by a detailed discussion of the implications of these findings.

Socio-economic Characteristics of Respondents

This section presents the findings from the analysis of the socio-economic characteristics of the respondents. It focuses on five key independent variables: sex, age, marital status, household size, farm size, educational attainment and farming experience.

Result in Table 1 shows that 55% of the respondents were males while 45% were females. This implies that farmers in the study area comprised of both males and females and hence farming in the study area is not gendered biased. According to Obe-Nwaka, Okidim and Agbagwa (2020) women are the powerhouse of subsistence agriculture in Nigeria, they are actively involved in farming and also need the services of extension agents.

Table 2 shows that 53.3% of the respondents were between the age groups of 41 – 50 years, 32.3% were less than 40 years and 14% were between the ages of 51 – 60 years. The mean age of the respondents was 43 years. This result is in agreement with studies done by Ayinde, Ajewole, Adeyemi and Salami (2018), with majority of the farmers in the study area being in their active and productive age group and hence can still perform effectively in farming and adopt improved practices disseminated by extension agents.

Results in Table 1 further shows that majority (72.7%) of the respondents were married while 16.3% were single. This implies that married individual constitutes farming household, and this has been reported to contribute significantly to household economic wellbeing and productivity. This result agrees with studies done by Alakpa and Ogbonwan (2016) which stated that married individuals will have a sense of responsibility to provide for the needs of their families.

Table 3 shows that more than half (51.7%) of the respondents had household size of 3 – 4 persons while 27.7% of them had household size of less than 2 persons with a mean household size of 3 persons. This implies that farmers in the study have moderate household size. However, it has been reported that farm households with large household sizes tend to have an alternate form of labour (family labour) which would help reduce the cost of hiring laborers for production (Michael, Polycarp, Abakura and Yidau, 2022)

Results in the Table also revealed that 55.7% had farm size of less than 2 hectare while 35% had farm size of 3 – 4 hectares with a mean farm size of 3 hectare. This implies that majority of farming household in the study area were small scale farmers. This result corresponds with the findings of Umeh, Igwe and Anyim (2018).

Results in Table 4 shows that the respondents in the study area obtained various forms of education. It was observed that 10.3% of the respondents had no education, 36.7% obtained a primary school certificate, 33.3% obtained secondary school certificate and 20% of them had obtained tertiary education as their highest level of educational qualification. This implies that farmers are educated and hence will be able to appreciate the efforts of extension agents and will also be able to assess their effectiveness in terms of service delivery. Studies done by Igbinosa, Onemolease, Umar and Ogwuche (2016) reported that educational levels of farmers have a positive and significant effect on farm productivity and adoption.

As shown in the Table, 51% of the respondents had been farming for 11 – 20 years, 44.3% had been farming for less than ten years with a mean farming experience of 12 years. This implies that farmers are well experienced and hence can easily evaluate the effectiveness of extension agents in meeting their information and improved farm practice needs. The average experience of 12 years implies farmers can readily evaluate extension effectiveness drawing on their practical knowledge (Davis, Franzel, and Spielman, 2016).

Table 1: Socioeconomic characteristics of the farmers (n = 300)

Variables	Description	Freq.	%	Mean
Sex	Male	150	50.0	
	Female	150	50.0	
Age (Years)	< 40	97	32.3	
	41 – 50	160	53.3	43.10
	51 – 60	42	14.0	
	>61	1	0.3	
Marital status	Single	49	16.3	
	Married	218	72.7	
	Widowed	17	5.7	
	Divorced	16	5.3	
Household size	<2	83	27.7	
	3 – 4	155	51.7	3.46
	5 – 6	23	7.7	
	>7	39	13.0	
Farm size (Ha)	< 2	167	55.7	
	3 – 4	105	35.0	2.45
	>5	28	9.3	
Educational level	No education	30	10.0	
	Primary education	110	36.7	
	Secondary education	100	33.3	
	Tertiary education	60	20.0	
Farming experience (Years)	< 10	133	44.3	
	11 – 20	153	51.0	12.16
	21 – 30	13	4.3	
	>31	1	0.3	

Effectiveness of Extension Services Delivery to Production Practices

Variables listed in the research instrument were used to assess farmers felt contributions of extension agents in delivering services as regards to agricultural production.

Table 2 shows that more than half (59.7%) of farmers were indifferent about extension workers discharging their duties with high level of professionalism while 40.3% of them were of the agreement that extension workers discharged their duties with high level of professionalism. This implies that majority of farmers in the study have not felt the impact of extension agents and hence could not measure how effective extension agents were in delivering their services. This finding is in accordance with Olorunfemi, Oladele and Olorunfemi (2021) who reported that the uncertainty surrounding the professionalism of extension agents' points to problems with performance management and service quality. They discovered that in their study in Nigeria, farmers were not very satisfied with extension services delivered and that there was no system in place to hold agents accountable for their commitment and incompetence.

Table 2: Effectiveness of extension services delivery to respondents' production practices

Statement	Responses	Freq.	%
Extension workers discharge their duties with high level of professionalism	Yes	121	40.3
	No	0	0.0
	Undecided	179	59.7
Information gotten from extension workers is from credible and reliable source	Yes	114	38.0
	No	0	0.0
	Undecided	186	62.0
Category of extension agents that you encounter most in terms of service delivery	Local Government	86	28.7
	level	49	16.3
	State level	165	55.0
	Federal level		
Most used method for receiving information from extension services	Individual contact	300	100.0
	Group contact	0	0.0
	Mass contact	0	0.0
	Contact farmer	0	0.0

The findings in Table 2 further showed that 62% of the respondents remained undecided on information from extension agent being from credible and reliable source while 38% of them confirmed that they believed that the extension agents' source of information was from credible sources. This can be attributed to the fact that farmers lack the means of actually determining the credibility of information sources used by extension agents in delivering their services, this can be due to poor extension-farmer linkage, Asiabaka and Anaeto (2016) blamed this on the collapse of institutional frameworks of extension services.

The findings further show the farmers' perception on the category of extension agents that they encounter most in terms of service delivery, 55% of respondents reported that they encountered extension agents at federal government level more, 28.7% stated they encountered more at the local government level, while 16.3% for state level. This implies that farmers have not felt the presence of extension agents at the community level where majority of farmers are located and hence extension service delivery is not highly implemented at the community level.

Results in Table 2 also show the medium with which farmers have received extension services. Majority (100%) of respondent reported that they have received extension services through individual contact with extension agents. This finding disagrees with studies done by Ferri, Grifoni and Guzzo (2020) which demonstrated how continued reliance on individual

extension contact limited reach and cost-effectiveness. As suggested by Baumüller (2021), integrating digital technologies and group-based techniques could aid in expanding and diversifying advisory services to a larger number of farmers. For efficiency, multi-channel, ICT-enabled extension is essential.

Relationship between the Socio-economic Characteristics of Farmers and the Effectiveness of Extension Service Delivery to Production Practices of Respondents

Results of logistic regression analysis in Table 3 indicated that there was significant relationship (t-value > t-critical) between age of the farmer (t-value=3.385); educational attainment (t-value 2.927 >1.96); household size (t-value= -3.424) and the effectiveness of extension service delivery to production practice.

The results show that age is positively related to the effectiveness of extension service delivery ($p < 0.05$). For each additional increase in age, the odds of effective extension service delivery increase by 3.6% (Odds Ratio = 1.036). Educational attainment is also positively related to the effectiveness of extension service delivery ($p < 0.05$). Higher education attainment increases the odds of effective extension service delivery by 67.7% (Odds Ratio = 1.677). Household size showed negative relationship to the effectiveness of extension service delivery ($p < 0.05$). For each additional household member, the odds of effective extension service delivery decrease by 34.8% (Odds Ratio = 0.652).

The pseudo-R^2 value of 0.713 indicates that approximately 71.3% of the variance in the effectiveness of extension service delivery is explained by the independent variables in the model.

Table 3: Relationship between the socioeconomic characteristics of farmers and the effectiveness of extension service delivery to their production practice

Independent variables	Coefficient (B)	Std. error	t-value	Odd ratio
Constant	-4.187	2.112	-2.307	0.003
Age	0.035*	0.011	3.385	1.036
Farming experience	0.062	0.031	-1.310	1.036
Education attainment	0.517*	0.14	2.927	1.677
Household size	-0.397*	0.112	-3.424	0.652
Farm size	0.013	0.073	0.178	1.013

*Significant at the 5% level benchmark (critical t = 1.96); -2 Loglikehood ($X^2 = 17.715$); df = 8; $p<0.001$; Goodness-of-fit test ($X^2 = 203.330$); df = 178; $p>0.050$; Critical $X^2 = 213.074$; Pseudo R-Square ($R^2 = 0.713$)

CONCLUSION

The results from this research show that most of the farmers in the study area were married and in their active age, with a form of formal education, and have vast experience in agricultural production. Most of them cultivated relatively small farm size, with a small household size. Most of them were indecisive about the professionalism of extension agents and the credibility of their information source. According to this research, age, educational attainment and household size had a significant influence on the effectiveness of extension service delivery.

Based on the results of this study, it is recommended that, extension service providers should be well funded and equipped with the necessary tools needed in carrying out their duty, in order to promote an effective learning condition for the farmers.

Proper training, adequate staffing and recruitment, use of effective teaching methods should be carried out, in order to encourage farmers' participation, and increase the overall objectives of extension practices.

Continuous monitoring and feedback, which will give room for improvement and adjustment, should be carried regularly to assess the effectiveness of the service delivered.

The use of simple and easy to understand materials, specifically for farmers with little or no educational background should be encouraged.

Technological tools and methods e.g. online forums, and mobile apps should be adopted in delivering services, this will help conquer the problem that comes with population and also permit farmers to access trainings at their convenience.

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