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Impact of Access to Extension Services on Yield and Income of Cooperative Members in South-East, Nigeria

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Abstract
Adoption of improved agricultural technologies is encouraged by access to extension services. This study evaluated the effect of having access to extension services on the income and output of members of agricultural cooperative societies in Abia and Anambra states of Nigeria. One hundred and twenty respondents were chosen from the cooperative societies using a multistage sampling technique. A structured questionnaire was used to gather primary data. Both descriptive and inferential statistics were used to analyze the data. Frequency tables, percentages, and mean thresholds of four- and five-point Likert scale measurements were employed as descriptive statistics while simple linear regression was used as inferential statistics. Only 38% of the respondents had extension contact in the year under review, according to the findings, and the majority (53.3%) only visited once in year. Additionally, the findings showed that the respondents had a high level of utilization of cassava production and value-addition technologies as well as sweet potato production and value-addition technologies. The low extension farmer ratio, the distance from the farm to the extension office, the high cost of transportation, insecurity, credit availability, cultural obstacles, inaccessible roads, and poor communication were the main challenges to accessing extension in the study area. At 5% and 1% levels of significance, access to extension had a positive and significant impact on the farmers' yield and income respectively. To close the low extension agent-farmer gap, the study advocated policies focused on the deployment of more logistical, financial, and human resources to improve agricultural extension delivery services through the ADPs.

Keywords: Impact, Extension access, Income, Cooperative members, and Yield

Introduction

Agriculture plays a pivotal role in Nigeria's economic development, with smallholder farmers constituting a significant portion of the agricultural workforce. Unfortunately, these farmers face numerous challenges that hinder their productivity and income, thus limiting their potential contribution to the nation's agricultural sector. The development and transfer of improved agricultural technologies to smallholder farmers in rural areas is necessary to address this issue, according to Asfaw *et al*. (2013). Rural farmers face obstacles such as a lack of credit, restricted access to markets, and a lack of extension contacts, but inadequate extension services have been identified as a key factor limiting the growth of the agricultural sector and overall rural community development (Asfaw *et al*., 2012).

To alleviate rural poverty and food insecurity, agricultural extension initiatives have become essential. Through these initiatives, technology is transferred, adult learning in rural areas is supported, and farmers are involved in problem-solving and agricultural knowledge and information systems (Christoplos, 2000). Agricultural extension is essential for the transfer of technology because its main objective is to improve farmers' knowledge of rural development. To support efforts to enhance agriculture and rural areas, agricultural extension is crucial (Bonye *et al*., 2012). Extension services, according to Bonye *et al*. (2012), enlighten farming communities about new technology that, when accepted, can raise production, incomes, and living standards. The introduction of innovations to farm households, speeding the acceptance rate, and managing change while promoting continual dissemination are all important tasks performed by extension service providers (Alemu *et al*., 2016).

The significance of extension access in technology transfer and higher productivity in the context of sub-Saharan Africa (SSA) has received a lot of attention (Anderson and Feder, 2007; Davis, 2008; Davis *et al*., 2012). Empirical evidence suggests that institutional arrangements and governmental investments that enhance agricultural extension services are crucial in

facilitating technology transfer for rural poor farmers (Anderson and Feder, 2007; Davis, 2008; Dercon *et al*., 2009; Ito *et al*., 2012). For instance, Owens *et al*. (2003) demonstrated that access to extension services in rural Zimbabwe improved grain productivity by 15%. According to research by Abdoulaye *et al*. (2013), farmers in Nigeria were more knowledgeable about and used new technologies when they were close to change agents. Similar conclusions were drawn by Sodiya *et al*., 2007, whose results revealed a positive relationship between access to extension services and the adoption of improved cassava varieties in Nigeria. Furthermore, it has been found that members of farmers' associations have greater access to credit and agricultural extension services than non-members (Okwoche and Obinne, 2010). Farmers are therefore urged to establish cooperative organizations or associations to encourage the adoption of better production technology and higher income through improved access to extension services and necessary agricultural inputs.

Despite the recognition of agricultural extension services as a potential solution to the challenges faced by smallholder farmers, there is a lack of comprehensive research focusing specifically on cooperative societies in South-East, Nigeria. Existing research mostly focuses on different geographical areas or falls short of elucidating in-depth the specific difficulties faced by farmers in this situation and the effects of extension services on their income and yield. For the development of successful agricultural policies and interventions in South-East Nigeria, it is essential to close this research gap. The results of this study will add to the body of knowledge already available on agricultural extension services and educate policymakers, agricultural organizations, and development professionals about the need to promote and enhance access to extension services in Nigeria.

This study aims to determine how the income and yield of cooperative members in Southeast, Nigeria are affected by their access to extension services. The study described the socioeconomic characteristics of the respondents. It also examined respondents' access to extension service delivery, assessed respondents' perceptions of factors influencing access to extension service delivery, and estimated the impact of respondents' access to extension service on their yield and income.

Methodology

The research was carried out in South-East Nigeria. The study used a multi-stage sampling technique. Anambra and Abia states were specifically chosen due to the presence of the National Root Crops Research Institute in those locations. Two L.G.As from Anambra and Abia states were purposively selected for the second stage. These LGAs are Awka North and Ayamelum in Anambra and Isiala Ngwa South and Umuahia South in Abia. This is a result of the high concentration of agricultural and crop cooperative societies there. From each of the LGAs, two cooperative societies were randomly selected for the third stage. The membership lists of each of the selected cooperative societies were used in the fourth stage to select 15 cooperative members at random, giving a total of 120 respondents. The cooperators' information was gathered using a structured questionnaire. Descriptive and inferential statistics were used to analyze the data. Percentages and means were used to describe the socioeconomic characteristics of the respondents and their level of access to extension services. A five-point Likert scale with the following weightings was used to get the average score for perceived factors influencing access to the delivery of extension services: Strongly Disagree = 1, Disagree = 2, Undecided = 3, Agree= 4, and Strongly Agree = 5. Significant responses were defined as those with a calculated mean score of 3 or higher. The impact of access to the delivery of extension services on the income and yield of the respondents was realized with z -the test.

Results and Discussion

Socio-economic Characteristics of the Respondents

The descriptive statistics for the key variables are shown in Table 1. The data show that the majority of the respondents (66%) were within the age range of 20 and 39 years implying that the respondents were still in the potential age of production. This was also illustrated by Guo *et al*. (2015), who noted that the active age of farmers ranges from 25 to approximately 45 years. About 58% of the cooperators are female and 73% are married. Most of the respondents (60%) have small household sizes of between 1 and 5. Most of the respondents (96%) are literate. However, only about 17% have post-secondary education. This suggests that the vast majority of farmers have only completed secondary education as reported by Houessou *et al*. (2020). In terms of yield and income, respondents' mean yield and annual income from root and tuber crops were about 44 t/ha and N527, 333 respectively.

Respondents Access to Extension Services Delivery

The distribution of respondents by access to extension services is shown in Tables 2a and 2b. Only 38% of the respondents had extension contact in the year under review, according to the result in Table 2a. The majority (53.3%) of respondents with extension contact were only visited once throughout the entire year, according to Table 2b, which shows the number of extension visits respondents had during the year under review. This suggests that access to extension services delivery in the study area was low.

Respondents' Perceived Factors Influencing Access to Extension Services Delivery

According to the results in Table 3, respondents perceived that factors like a low extension farmer ratio (x=4.40), distance from the farm to the extension office (x=3.67), transportation costs (x=3.67), insecurity (x=3.52), credit availability (x=3.39), cultural barriers (x=3.36), inaccessible roads (x=3.29), and poor communication (x=3.14) affected access to extension services delivery in the study area. The cooperative

members were constrained by the factors outlined in the study, as indicated by the grand mean of 3.43.

Impact of Access to Extension Services on the Yield and Income of Respondents

The z-test results in Table 4 show that cooperators with access to extension had a yield that was 20.84 t/ha higher than those without access, which was statistically significant at the 1% level of probability. In a similar vein, cooperators with access to extension had N196,992 more in income than those without access, which was similarly statistically significant at the 1% level of probability. It may be inferred from this that respondents' yield and income were significantly impacted by their use of extension services. This result is contrary to the study of Feder *et al*. (2004), which found no link between extension programs and crop productivity. However, it is consistent with earlier research on the beneficial impacts of extension programs on crop farm productivity (Davis *et al*. 2012; Okafor and Umebali, 2019).

Conclusion

In conclusion, the majority of respondents were women, in their prime working years, educated, married, and living in small households. In the study area, there was low access to extension service delivery. The low extension farmer ratio, the distance from the farm to the extension office, the high cost of transportation, insecurity, credit availability, cultural barriers, inaccessible roads, and poor communication were barriers to accessing extension services in the study area. The income and yield of cooperators with access to extension differ significantly from those without access. This suggests that access to extension services has a significant impact on the respondents' yield and income.

The following recommendations are made as a result of the study:

- Reviving and enhancing the activities of the Agricultural Development program in the study area.
- Policies are designed to increase the availability of personnel, funds, and logistical resources to improve agricultural extension service delivery through the ADPs. This will reduce the gap between extension agents and farmers, increase the number of visits, and increase farmers' productivity in terms of income and yield.
- Cultural barriers may prevent some farmers from seeking extension services. Employing gender-sensitive approaches and awareness campaigns can encourage all farmers, including women, to actively participate in extension programs.
- Limited access to credit hinders farmers from seeking extension services. Providing soft loans or subsidies for inputs can encourage more farmers to engage with extension workers and benefit from improved agricultural technologies.

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Table 1a: Socioeconomic characteristics of the respondents

Option	Frequency	Percentages
Age		
20-29	21	17.50
30-39	58	48.33
40-49	23	19.17
50 and above	18	15.00
Sex		
Male	50	41.67
Female	70	58.33
Marital status		
Married	88	73.33
Single/Divorced/Widowed	32	26.67
Education level		
Non-formal	5	4.17
Primary	27	22.50
Secondary	68	56.66
Tertiary	20	16.67
Household size		
1-5	72	60.00
6-10	47	39.17
11-20	1	0.83

Source: Field Survey, 2023; N = 120

Table 1b: Summary Statistics of Income and Yield of Respondents

Variable	N	Mean	Std. Deviation	Min.	Max.
Income (N)	120	527,333.30	307,132.10	15,000	1,000,000
Yield (tons/ha)	120	44.18	29.68	5	96

Source: Field Survey, 2023

Table 2a: Respondents' distribution according to their extension contact

Response	Frequency	Percentage
Yes	45	37.5
No	75	62.5
	120	100

Source: Field Survey, 2023

Table 2b: Respondents' distribution according to their number of extension visits

No. of visits	Frequency	Percentage
1	24	53.3
2	14	31.1
3	4	8.9
4	2	4.4
5	2	2.3
	45	100

Source: Field Survey, 2023

Table 3: Perceived factors militating against access to extension service delivery

Perceived factors	Mean	SD	Decision
Distance from farm to extension office	3.67	1.47	Constraint
Access to credit	3.39	1.36	Constraint
Transportation cost	3.67	1.36	Constraint
Insecurity	3.53	1.38	Constraint
Inaccessible road	3.29	1.41	Constraint
Poor communication network	3.13	1.36	Constraint
Influence of Local Champions	2.42	1.17	Not constraint
Cultural barrier	3.35	1.45	Constraint
Low extension farmer ratio	4.40	0.71	Constraint
Grand mean	**3.43**		

Source: Field Survey, 2023; Benchmark mean score = 3.00

Table 4: Z-test table showing the effect of access to extension services on yield and income of cooperators

	Without access		With access		
Variable	**Mean**	**SD**	**Mean**	**SD**	**Z-test**
Yield	36.0137	28.32328	56.85106	27.45508	-4.0081***
Income	450178.1	295877.4	647170.2	287894.6	-3.6191***