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ASSESSMENT OF EFFECTIVENESS OF EXTENSION AGENTS IN INFORMATION DISSEMINATION TO POTATO FARMERS IN DELTA STATE, NIGERIA

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Abstract
This study assessed effectiveness of extension agents in information dissemination to potato farmers in Delta State, Nigeria. The sample was obtained using a multistage sampling procedure as a result of which 280 respondents were identified, and 268 valid questionnaires were analysed. The data were gathered through a structured questionnaire and analysed using descriptive statistics and multiple regression. Results showed that majority (65.7%) of the respondents were female, majority (73.1%), with an average age of 44.8 years, and average farm size of 0.6 hectare thus representing the presence of smallholder farmers. Agronomic information on superior varieties of seeds (Mean = 3.24), control of pests and diseases (Mean = 3.20), and fertilizer management (Mean = 3.18) were largely spread through the extension agents, but there was poor dissemination of financial and record-keeping information. Farm visits (Mean 3.24) and group visits (Mean 3.20) were the most commonly used communication means. The most frequent were monthly contacts (32.8 1/3), at which the farmers valued the clarity of information and their relevance; though, follow-up after visits was poor (Mean 2.46). Regression analysis showed that educational attainment, farming experience, farm size and membership of farmers associations played very significant roles in effectiveness ($p < 0.01$). Among the major constraints were a shortage of extension agents (Mean=3.34), insufficient funding (Mean=3.28) and absence of transportation facilities (Mean=3.23). The research extension staff should be recruited to boost coverage and service delivery in Delta State.
Keywords: *Assessment, Extension Agents, Potato farmers, effectiveness, information.*

1.0 Introduction

Agricultural extension plays a critical role in improving agricultural productivity, rural livelihood and bolstering food security by means of disseminating research-based innovations to farmers in time. The extension agents act as the linking factors between the research institutions and the farmers so that farmers are informed on the most current and relevant data on better production methods, pest and disease control, adapting to the climate, and market opportunities. It is also well known that the effectiveness of extension service delivery systems is a determinant of agricultural transformation (George et al., 2020). However, the inadequate staffing, ineffective logistics, insufficient financing, and lack of training opportunities have limited performance of extension agents in most parts of Nigeria (Owoade et al., 2025).

The sensitivity to climatic variability, outbreak of pests, diseases, and after-harvest losses creates the need to have accurate and timely technical information in potato farming. Empirical research has recorded that potato farmers require information on better seed varieties, storage methods, market prices, and weather conditions (Abashe & Ayatse, 2023).

It has been established in Delta State that structural and institutional constraints question the effectiveness of extension agents in performing their duties. Ozioko et al. (2022) noted that extension agents did not have sufficient infrastructural backing and training opportunities, although they had knowledge that was applicable to climate change adaptation. Similarly, Agbamu and Edono (2014) presented the low level of contact between farmers and extension workers in Delta State, as a conclusion of the study, which found that extension services do not work in general. Close and frequent contact between farmers and extension agents is critical to providing feedback, clarity and reinforcement of agricultural messages; otherwise, information dissemination might not provide a meaningful response to adoption.

The effectiveness is also affected by communication channels used in the extension delivery. Kigatiira et al. (2018) discovered that adoption of Irish potato farming practices was promoted by interpersonal communication and mass media when the latter were participatory and responsive. Waaswa et al. (2021) also reported that variations in information distribution channels had a substantial impact on adoption of climate-smart farming methods among by farmers.

In addition, the quality of information dissemination is highly influenced by the attitudes, skills and motivation of the extension agents. Ojo et al. (2025) noted that a significant proportion of extension agents had poor attitudes regarding dissemination of climate-smart practices, and their levels of participation were moderate. According to by Asante (2024), extension agents had moderate digital skills and low practical skills in new agricultural technologies. Poor capacity building and training can thus reduce successful performance extension agents. These weaknesses are also expressed in the way farmers perceive them; Nwalieji and Nnabueze (2018) and Bukola (2025) identified poor funding, insufficient training, lack of motivation, and lack of trust as key limiting factors to effectiveness of extension service delivery.

2.0 Objective of the study

The broad objective of this study was to assess effectiveness of extension agents in information dissemination to potato farmers in Delta State. The specific objectives were to:

i. describe the socioeconomic characteristics of the respondents
ii. identify the types of information disseminated by extension agents to potato farmers;
iii. ascertain the channels used by extension agents in disseminating information to potato farmers;
iv. assess the frequency and quality of contact between extension agents and potato farmers;
v. determine effect of socio-economic characteristics on effectiveness of extension agents; and
vi. identify constraints to effectiveness of extension agents in information dissemination to potato farmers in Delta State.

3.0. Methodology

This research was carried out in Delta State, Nigeria. Delta State is located in the South-South geographical region of the country and lies approximately between latitudes 5°00′ and 6°30′ North of the Equator and longitudes 5°00′ and 6°45′ East of the Greenwich Meridian. The State is a border of Edo State on the North, Anambra State on the East, Bayelsa State on the South, and the Bight of Benin on the West. It covers a land area of approximately 17,440 square kilometres and its climate is tropical, with wet and dry climates. Annual rainfall is between 1,500 mm in the North and above 2,500 mm in the coastal belt and the average temperature is between 26^{o}C - 32^{o}C. Farming is a significant rural household activity in the State. Crops grown by farmers include cassava, yam, maize, vegetables, and potatoes.

The population of the study comprised all registered potato farmers in Delta State under the Delta State Agricultural and Rural Development Authority (DARDA), as well as extension agents responsible for crop production in the selected agricultural zones.

The study used a multistage sampling procedure. Two agricultural zones in Delta State where root and tuber crop production was significant were purposively chosen in the first stage depending on their favorable agro-ecological environment, concentration of smallholder farmers and presence of DARDA extension services. The second stage involved the selection of three Local Government Areas (LGAs) in each of the zones based on the intensity of potato farming activities relative to its accessibility to data collection.. In the third phase, two farm communities were chosen randomly in each LGA making it twelve communities. At the last step, the names of registered potato farmers were acquired at DARDA offices within the sampled communities and simple random sampling was applied to select the respondents proportionately. The selection of a total population of 280 potato farmers was based on the idea of wider coverage, enhanced statistical validity and strength of analysis. Purposely selected LGAs were also captured in extension agents who served the selected LGAs to offer complementary information on the delivery of extension services.
A total of 280 questionnaire were administered to potato farmers across the selected Local Government Areas, and 268 properly completed questionnaire were returned and used for analysis, representing a response rate of 95.7%.

The study collected primary data. The collection of the data was conducted by administering a structured questionnaire to the sampled potato farmers. The questionnaire had mostly closed questions and was categorized into subgroups addressing socio economics factors, source of information obtained, mode of communication used, frequency of contact with the extension agents, perceived efficacy on extension services and restraints on information transmission.

Data were collected, analysed using descriptive and inferential statistical tools. The socio-economic features of the respondents, the sort of information disseminated, the channels used to disseminate information, the frequency and perceived effectiveness of the extension contact, as well as the limitations on the effectiveness of the extension were described using descriptive statistics, including frequency counts, percentages, means, and standard deviations. Inferential statistics like multiple regression analysis were used to test the impact of social-economic factors on perceived effectiveness of extension agents.

4.0 Results and Discussions

4.1 Socio-Economic Characteristics of Potato Farmers

Table1, shows that majority (65.7%) of the respondents were females, implying that women had high representation in root and tuber crop farming. Such trend is not similar to the conclusions of Agbamu and Edono (2014) who found that male dominance in agricultural activities connected with extensions prevailed in the Delta State, yet in agreement with Agbelemoge et al. (2020) that found that women participated in arable crop farming in large numbers. The median age of 44.8 years, and the greatest percentage (34.3) in 41-50 years category, reveals that the respondents were mostly in their productive and innovative adoption years, as it is also done by Ebewore and Isiorhovoja (2019). The large proportion of married respondents (73.1%) indicates that these individuals are likely to be stable in a household and possibly have access to family labour which can affect responsiveness to extension information. Most of them were educated with at least primary education, 41.0% secondary education, 17.2% tertiary education and this is moderate literacy that can strengthen the understanding of the extension messages; this is in line with what Nwalieji and Nnabueze (2018) emphasised that education was critical in influencing the perception of farmers in the quality of extension services.

Table 1: Socio-Economic Characteristics of Respondents (n = 268)

Variables	Frequency	Percentage
Sex		
Male	92	34.3
Female	176	65.7
Age (years)		

≤30	28	10.4
31–40	74	27.6
41–50	92	34.3
51–60	54	20.1
>60	20	7.6
Mean Age = 44.8 years		
Marital Status		
Single	36	13.4
Married	196	73.1
Widowed	24	9.0
Divorced	12	4.5
Educational Level		
Non formal education	34	12.7
Primary education	78	29.1
Secondary education	110	41.0
Tertiary education	46	17.2
Household Size (persons)		
1–5	72	26.9
6–10	148	55.2
11–15	38	14.2
>15	10	3.7
Mean Household Size = 8 persons		
Farming Experience (years)		
≤5	32	11.9
6–10	76	28.4
11–20	104	38.8
>20	56	20.9
Mean Farming Experience = 13.6 years		
Farm Size (hectares)		
≤0.5 ha	108	40.3
0.6–1.0 ha	96	35.8
1.1–1.4 ha	64	23.9
Mean Farm Size = 0.6 ha		
Membership of Farmers' Association		
Yes	182	67.9
No	86	32.1

Types of Information Disseminated by Extension Agents to Potato Farmers

Table 2, shows that dissemination of production-oriented information to the potato farmers was mainly done by the extension agents and the promotion of improved potato seed varieties was given the most priority (Mean 3.24). About 55.2% of respondents indicated that they received such information regularly. This emphasis on better varieties supports the results of Goni et al. (2025) who reported high awareness and usage of better potato varieties among farmers who had been exposed to extension services. The use of pest and disease control measures (Mean = 3.20) and fertilizer and soil-management practices (Mean = 3.18) also featured prominently in communication, which was a high degree of agronomic focus that was comparable to the findings of Apu and Ejike (2018), who found an emphasis on better production technologies in extension delivery. Recommended planting dates (Mean = 3.03) and climate and weather-related information (Mean = 2.89) were modularly shared, which is in line with Waaswa et al. (2021), who emphasized the significance of extension and media channels in facilitating the adoption of climate-smart

practices among potato farmers. There was also communication on weed-management recommendations (Mean = 2.85) and post-harvest handling information (Mean = 2.70), though at a less intensive level which showed a relatively lesser focus on post-production value-chain aspects. Market-price information (Mean = 2.55) barely exceeded the cut-off mean, which means that there were rather limited market-oriented advisory services, which was also reported by George et al. (2020), as the extension services often placed more emphasis on production rather than marketing support.

Table 2: Types of Information Disseminated by Extension Agents (n = 268)

Information Type	Regularly Freq (%)	Occasionally Freq (%)	Rarely Freq (%)	Not Received Freq (%)	Mean	Std. Dev.	Rank	Decision
Improved potato seed varieties	148 (55.2)	62 (23.1)	34 (12.7)	24 (9.0)	3.24	0.94	1st	Adequate
Pest and disease control measures	142 (53.0)	64 (23.9)	36 (13.4)	26 (9.7)	3.20	0.97	2nd	Adequate
Fertiliser and soil management practices	136 (50.7)	70 (26.1)	38 (14.2)	24 (9.0)	3.18	0.92	3rd	Adequate
Recommended planting dates	118 (44.0)	74 (27.6)	42 (15.7)	34 (12.7)	3.03	1.01	4th	Adequate
Climate and weather information	102 (38.1)	78 (29.1)	46 (17.2)	42 (15.7)	2.89	1.06	5th	Adequate
Weed management techniques	96 (35.8)	80 (29.9)	50 (18.7)	42 (15.7)	2.85	1.04	6th	Adequate
Post-harvest handling and storage	78 (29.1)	84 (31.3)	54 (20.1)	52 (19.4)	2.70	1.12	7th	Adequate
Market price information	64 (23.9)	82 (30.6)	60 (22.4)	62 (23.1)	2.55	1.15	8th	Adequate
Access to credit and input subsidies	48 (17.9)	70 (26.1)	74 (27.6)	76 (28.4)	2.34	1.17	9th	Inadequate
Record keeping and farm management	44 (16.4)	66 (24.6)	78 (29.1)	80 (29.9)	2.27	1.19	10th	Inadequate

Decision mean = 2.50

4.3 Channels Used by Extension Agents in Disseminating Information

Table 3: illustrates that the extension agents depended more on interpersonal and group communication media to convey information to potato growers. The highest ranking was in farm/home visits (Mean = 3.24), with 54.5% of respondents indicating that they use this channel frequently, therefore reinforcing the fact that face-to-face extension delivery is still common. This finding matches Iwuchukwu et al. (2018), who indicated that farm and home visits were commonly regarded as successful extension measures in crop farming. Other activities that were largely used were group meetings (Mean = 3.20) and demonstration plots (Mean = 3.10), which supports the participatory and practical nature of the extension service as was observed by Apu and Ejike (2018), who observed that farm visits, farmer training, and demonstration plots were widely used in the technology dissemination process. The use of phone calls and SMS (Mean = 2.93) and radio programmes (Mean = 2.82) was moderately high indicating a new form of integration between the

mass media and the mobile communication tools, which aligns with that of Goni et al. (2025), who highlighted the significance of traditional media like radio in reaching potato farmers.

Table 3: Channels Used by Extension Agents (n = 268)

Communication Channel	Frequently Freq (%)	Occasionally Freq (%)	Rarely Freq (%)	Not Used Freq (%)	Mean	Std. Dev.	Rank	Decision
Farm/home visits	146 (54.5)	64 (23.9)	34 (12.7)	24 (9.0)	3.24	0.95	1st	Highly utilized
Group meetings	138 (51.5)	70 (26.1)	36 (13.4)	24 (9.0)	3.20	0.92	2nd	Highly utilized
Demonstration plots	126 (47.0)	72 (26.9)	40 (14.9)	30 (11.2)	3.10	1.00	3rd	Highly utilized
Phone calls/SMS	108 (40.3)	74 (27.6)	46 (17.2)	40 (14.9)	2.93	1.08	4th	Highly utilized
Radio programmes	92 (34.3)	80 (29.9)	52 (19.4)	44 (16.4)	2.82	1.10	5th	Highly utilized
WhatsApp/social media	66 (24.6)	70 (26.1)	64 (23.9)	68 (25.4)	2.50	1.16	6th	Moderately utilized
Printed leaflets/bulletins	52 (19.4)	62 (23.1)	70 (26.1)	84 (31.3)	2.30	1.18	7th	Poorly utilized
Television programmes	48 (17.9)	58 (21.6)	74 (27.6)	88 (32.8)	2.24	1.20	8th	Poorly utilized

Decision mean = 2.50

4.4 Frequency of Contact between Extension Agents and Potato Farmers

Table 4 shows the frequency of contact between extension agents and potato farmers in the study area. The findings indicate that the largest percentage (32.8%) of respondents were in contact with extension agents monthly. This was preceded by 22.4% who had quarterly contact, and 19.4% who had fortnightly contact. Weekly contact was observed in 12.7% of the respondents and the same percentage (12.7%) reported that they had rarely contact (once or twice a year). Such a distribution suggests that the contact of extensions was mostly periodic but not frequent. Even though monthly interaction implies a certain level of organized interaction, the comparatively low share of weekly visits implies that the extent of extension coverage is limited. The result can be compared to the one of Sennuga et al. (2020), who reported irregular extension contact as a significant constraint on agricultural production.

Table 4: Frequency of Contact with Extension Agents (n = 268)

Contact Frequency	Frequency	Percentage
Weekly	34	12.7
Fortnightly	52	19.4
Monthly	88	32.8
Quarterly	60	22.4
Rarely (once or twice a year)	34	12.7
Total	268	100.0

4.5 Quality of Contact between Extension Agents and Potato Farmers

Table 5 represents the quality of contact between potato farmers and extension agents based on chosen indicators. The findings indicate that the clarity of the information described (Mean = 2.96) and the importance of described information to the needs of the farmers (Mean = 2.92) were rated high, meaning that the extension messages were mostly clear and related to the needs of farmers in production. This is in line with the results of Nwalieji and Nnabueze (2018), who pointed out that the clarity of the message is a significant determinant of how farmers perceive the effectiveness of the extension..

Table 5: Quality of Contact between Extension Agents and Potato Farmers (n = 268)

Quality Indicator	Very High Freq (%)	High Freq (%)	Low Freq (%)	Very Low Freq (%)	Mean	Std. Dev.	Decision
Clarity of information provided	94 (35.1)	96 (35.8)	50 (18.7)	28 (10.4)	2.96	0.99	High
Relevance of information to farmers' needs	88 (32.8)	102 (38.1)	48 (17.9)	30 (11.2)	2.92	1.00	High
Timeliness of information delivery	76 (28.4)	90 (33.6)	60 (22.4)	42 (15.7)	2.74	1.08	Moderate
Opportunity for feedback and interaction	70 (26.1)	84 (31.3)	64 (23.9)	50 (18.7)	2.65	1.12	Moderate
Practical demonstrations provided	82 (30.6)	88 (32.8)	54 (20.1)	44 (16.4)	2.78	1.05	High
Follow-up after initial visit	58 (21.6)	74 (27.6)	70 (26.1)	66 (24.6)	2.46	1.16	Low

Decision mean = 2.50

4.6 Effect of Socio-Economic Characteristics on Perceived Effectiveness of Extension Agents

The findings of a multiple regression analysis which analysed how socio-economic factors affect the perceived effectiveness of extension agents among potato farmers are shown in Table 6. The model was found to be statistically significant ($F = 29.874$, $p < 0.01$), which means that the explanatory variables had a joint influence on perceived effectiveness. The coefficient of determination ($R^2 = 0.612$) indicates that 61.2% of the perceived effectiveness variance was attributed to the presence of the socio-economic variables in the model whereas adjusted R 2 of 0.598 indicates a good model fit having adjusted the number of predictors. VIF values were between 1.36 and 1.92, which means that no multicollinearity existed among the independent variables. The level of education ($\beta = 0.214$, $p < 0.01$) had a positive and significant impact on perceived effectiveness, meaning that more educated farmers were more likely to consider extension agents to be effective. This observation aligns with Nwalieji and Nnabueze (2018), who also established that education had a significant impact on the view of extension services by the farmers. Farming experience ($\beta = 0.031$, $p < 0.01$) also had a positive and significant impact, implying that experienced farmers were more placed to assess and gain benefits of extension services, a trend that has also been seen by Iwuchukwu et al. (2018).

Table 6: Multiple Regression Analysis Showing the Effect of Socio-Economic Characteristics on Perceived Effectiveness (n = 268)

Variable	Coefficient (β)	Std. Error	t-value	p-value	VIF
Constant	1.284	0.312	4.115	0.000***	–
Age	-0.006	0.004	-1.500	0.135	1.42
Sex	0.118	0.074	1.595	0.112	1.36
Educational level	0.214	0.052	4.115	0.000***	1.78
Household size	0.019	0.011	1.727	0.085	1.54
Farming experience	0.031	0.009	3.444	0.001***	1.92
Farm size	0.287	0.081	3.543	0.000***	1.63
Membership of association	0.346	0.089	3.888	0.000***	1.49
Model Summary					
Statistics	Value				
R^2	0.612				
Adjusted R^2	0.598				
F-value	29.874				
p-value (F)	0.000***				

***Significant at 1% level

4.7 Constraints to Effectiveness of Extension Agents in Information Dissemination

Table 7 shows the barriers that hinder the success of extension agents in relaying information to potato farmers in Delta State. The findings show that the poor number of extension agents was the highest (Mean = 3.34), and 59.0% of the respondents rated it as very serious, and 23.1% rated it as serious. This observation reiterates the fact that the most significant constraint restricting effective extension coverage is a lack of manpower. The outcome is in line with those that were noted by Agoda et al. (2017) who reported poor extension staff as a significant impediment to quality service delivery. And closely linked with this was the lack of funding of extension services (Mean = 3.28) which achieved second place indicating that lack of funding reduced operational activities like field visits and programme implementation. Ozioko et al. (2022) also found that the lack of investment in the extension infrastructure adversely influenced outreach capacity. Deficit of transportation and logistics (Mean = 3.23) took the third position that mobility difficulties hampered routine visits to farms and supervision.

Irregular training of extension agents (Mean = 3.15) was also graded as serious, which presupposes the absence of capacity development and technical modernization, and Asante (2024) also stressed that skills of extension workers should be constantly improved. Weak institutional support of the extension system, as indicated by poor follow-up of farm visits (Mean = 3.07) and a large extension agent-farmer ratio (Mean = 3.05) also inhibited long-term farmer involvement.

Table 7: Constraints Affecting Effectiveness of Extension Agents (n = 268)

Constraint	Very Serious Freq (%)	Serious Freq (%)	Slightly Serious Freq (%)	Not Serious Freq (%)	Mean	Std. Dev.	Rank	Decision
In-adequate number of extension agents	158 (59.0)	62 (23.1)	30 (11.2)	18 (6.7)	3.34	0.92	1st	Serious
Poor funding of extension services	146 (54.5)	70 (26.1)	34 (12.7)	18 (6.7)	3.28	0.90	2nd	Serious
Lack of transportation/logistics	138 (51.5)	74 (27.6)	36 (13.4)	20 (7.5)	3.23	0.94	3rd	Serious
Irregular training of extension agents	124 (46.3)	82 (30.6)	40 (14.9)	22 (8.2)	3.15	0.99	4th	Serious

Poor follow-up after farm visits	118 (44.0)	78 (29.1)	46 (17.2)	26 (9.7)	3.07	1.03	5th	Serious
High extension agent–farmer ratio	112 (41.8)	84 (31.3)	48 (17.9)	24 (9.0)	3.05	1.01	6th	Serious
Low motivation of extension personnel	108 (40.3)	80 (29.9)	50 (18.7)	30 (11.2)	2.99	1.07	7th	Serious
Poor adoption response from farmers	86 (32.1)	88 (32.8)	58 (21.6)	36 (13.4)	2.84	1.10	8th	Serious
Inadequate ICT facilities	74 (27.6)	82 (30.6)	64 (23.9)	48 (17.9)	2.68	1.15	9th	Serious
Language barrier	48 (17.9)	66 (24.6)	74 (27.6)	80 (29.9)	2.30	1.18	10th	Not Serious

Decision mean = 2.50

5.0 Conclusion and Recommendations

5.1 Conclusion

The analysis centered on the kind of information shared, the media used, the frequency and quality of extension contact, the impact of socio-economic factors on perceived effectiveness, and the limitations on providing extension services. The study concluded that extension agents are important in passing on agronomic and production-related knowledge to potato growers in both interpersonal and grouping systems. Nonetheless, less attention was paid to financial, managerial, and market-oriented information. Whilst the quality of information offered during contact was usually satisfactory, the inconsistent frequency of contact and poor follow-up mechanisms constrained the effectiveness of the overall services. Additionally, socio-economic factors like education, experience in farming, size of farm and farmers association membership had a strong impact on the perception of extension effectiveness by the farmers. Optimal information dissemination was also restricted by structural and institutional issues in the extension system. Even though the extension services were in operation and played a role in knowledge transfer among the potato farmers, there were significant service gaps in coverage, in terms of support services and institutional capacity that were to be addressed by policy and operational consideration. According to the study findings, the following recommendations are given:

5.2 Recommendations

Based on the finding, the following recommendations were made:

i. The Delta State Government needs to hire more extension agents and allocate more funds to the Agricultural Development Programme (ADP) to lower the high extension agent-farmers ratio, increase the frequency of farm visits, and supply sufficient logistics like transportation and working materials.
ii. Extension agents should be provided with regular training and retraining programmes to improve their technical competence, especially financial advisory services, record-keeping, using digital extension tools, and climate-smart production practices in potato production.
iii. Follow-up mechanisms should be built with extension services when they give the first visit to the farm and take a balanced approach to combine agronomic, market, and financial information..
iv. Farmer cooperatives should be strengthened to serve as effective platforms for group-based extension delivery..

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