

ISSN: 2695-2556 (Online)

ISSN: 2651-5679 (Print)

AKSU Journal of Agriculture and Food Sciences 8(3) 91-102
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Assessment of Social Media Usage by Extension Workers in Bogoro Local Government Area of Bauchi State, Nigeria

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Abstract

Effective social media communication relies on using the most appropriate channel for information dissemination. However, many extension workers and agricultural stakeholders often overlook the importance of selecting the right social media platforms for their communication needs. This research examined the use of social media by extension workers in the Bogoro Local Government Area of Bauchi State; Nigeria. A multi-stage sampling procedure was employed to select 109 respondents. Descriptive statistics and logit model were utilized to meet the study's objectives. Findings revealed that majority of the extension workers (59.6%) were male, with an average age of 54 and a literacy rate of about 98%, as most had completed tertiary education. Approximately 80.5% of the workers were married, and 68.8% had 21 to 30 years of work experience. The average household size among these workers was 9, and their mean annual income was ₦549,568. Of the 109 respondents, 91 (83.49%) engaged with some form of social media, while 16.51% did not use it at all. Furthermore, the findings show that among the 91 social media users, the three most preferred platforms were Facebook (100%), WhatsApp (92.31%), and YouTube (61.54%). Factors significantly influencing social media usage include age, education, work experience, and gender. All the factors were positively significant at the 5% level except for age which was negatively significant at the 1% level of probability. Major challenges reported by 83.5% of extension workers included poor network connectivity and 82.6% cited high costs of accessing social media. The study recommends that the government enhance network infrastructure to facilitate social media usage. Additionally, it calls for policies to improve the welfare of extension workers, which would encourage more individuals to pursue careers as extension agents.

Keywords: Social media, Extension workers, Bogoro LGA, Socio-economic factors

1.0 Introduction

The agricultural sector in Nigeria has been experiencing a decline due to issues like poor infrastructure, weak connections between professionals and farmers, and limited access to vital agricultural information (Wasihun, 2022). To ensure food security, especially for rural communities, the sector needs to improve its efficiency and resilience. Utilizing social media for agricultural communication can foster essential connections among stakeholders and enhance information sharing, leveraging the potential of the internet to address these challenges. Suchiradipta and Saravanan (2016) described social media as online tools for electronic communication that enable users to engage, produce, share, access, and trade information and ideas in various formats (text, images, video, etc.) that can be discussed, stored, and utilized by anyone within virtual communities and networks. Social media platforms like Facebook, Twitter, YouTube, and WhatsApp have become essential components of human existence. Numerous people worldwide utilize these applications in their everyday lives for communication and entertainment, among other pursuits.

Meanwhile, professionals in both the public and private sectors leverage social media platforms to fulfil their responsibilities and advance their organizational objectives in various domains, including marketing (Abdullahi, 2020). Furthermore, Kuria (2014) asserts that social media has revolutionized communication by bypassing traditional gatekeepers like editors, although it still complements traditional media rather than replacing it. While traditional media offers companies greater control over audience engagement, social media empowers users to create and share content. Additionally, social media breaks down geographical barriers, facilitating idea exchange and important discussions. However, this transformation has also led to significant social movements and cultural shifts, highlighting both its benefits and drawbacks.

Harley (2013) notes that the vast, unregulated nature of social media platforms can contribute to the spread of false information and rumour. It can also hinder meaningful physical interactions, which are crucial for effective networking and development. Despite these challenges, the use of social media among stakeholders in the agricultural sector is on the rise. Social media can effectively equip young people with information related to agriculture and education, encouraging their involvement in agricultural activities. It serves as a platform to improve the perception of agriculture among a wide audience and facilitates the exchange of information and experiences between youth and young farmers (Bamiro and Oyetoki, 2019).

The agricultural extension system in Nigeria presents new methods and concepts to farmers to enhance their agricultural practices and elevate their quality of life. Extension workers educate farmers on land enhancement, and cropping strategies, and encourage them to embrace contemporary agricultural techniques tailored to their socioeconomic circumstances. They not only disseminate research results but also tackle farmers' issues by creating appropriate initiatives. However, extension professionals encounter obstacles such as restricted time for farm visits, a low ratio of extension agents to farmers, and insufficient communication skills (Akinragbe *et al.*, 2017). Extension agents should engage youth in agriculture through social media to ensure the sustainability of the sector. Youth involvement is crucial for boosting agricultural production and reducing unemployment in Nigeria (Adebayo, 2017). Young people possess the energy, creativity, and innovation necessary for large-scale agricultural endeavors. Their role as the next generation is vital for the future sustainability of agriculture, highlighting the need to secure their interest and active participation in the field (Nwanko and Anyanwu, 2021).

Agwu *et al.* (2023) conducted a study on Agricultural Extension and Advisory Services across Nigeria, Malawi, South Africa, Uganda, and Kenya. However, they did not address the role of social media in improving the effectiveness of extension services in Nigeria. This study seeks to fill that gap. Meanwhile, Alhassan *et al.* (2023) explored social media usage in agricultural extension service delivery in Northwest Nigeria. Although their research was valuable, it was limited to that area. This study, on the other hand, focuses on Northeast Nigeria. Agricultural extension is essential for the agricultural sustainability of any nation, and the extent of attention given to it could greatly contribute to addressing food insecurity in the country.

Agricultural extension plays a crucial role in promoting sustainable development through training programs, but traditional extension models have proven ineffective in encouraging the adoption of sustainable practices. Successful agriculture and rural development depend on informed actions by rural communities, yet new agricultural technologies and knowledge become meaningless if not effectively communicated to farmers. Social media presents significant opportunities for millions of farmers to access information regardless of geographic barriers, facilitating the distribution and sharing of new technologies. Various social media platforms have been created to educate farmers through shared information links and news articles, as well as to enable inquiries and feedback. However, challenges remain, such as a lack of awareness and low usage of social media among extension workers in rural areas of developing countries. The study assesses the social media usage by extension workers in Bogoro Local Government Area of Bauchi state with specific objectives to:

- i. Describe the socio-economic characteristics of extension workers;
- ii. Identify preferred social media used by the extension agents;
- iii. Determine factors influencing the use of social media by extension workers; and
- iv. Identify the challenges encountered by extension workers in the use of social media.

2.0 Materials and Method

2.1 The Study Area

The study was carried out in the Bogoro Local Government Area (LGA) of Bauchi State, which has its headquarters in the town of Bogoro. This town is situated at latitude 9.650° N and longitude 9.6167° E. The LGA spans an area of 894 km² and has a population of 84,215 according to the National Population Commission and National Bureau of Statistics Estimates (2016). With a growth rate of 3.5% as of 2020, the projected population for the LGA is 142,326. Bogoro experiences an annual rainfall of 1,190 mm and is located at an elevation of 775 to 1,792 meters above sea level (Bukata *et al.*, 2015). The region has a tropical, sub-humid climate characterized by distinct wet and dry seasons: the wet season lasts from May to October, while the dry season extends from November to April. The area features sparse vegetation and a predominantly hot climate throughout the year (Shamaki and Iheke, 2010). The primary language spoken is Zazaki (Sayawa), with Hausa, Jarawa, and English also spoken. Most residents are farmers, but during the dry season, they often engage in activities such as welding, carpentry, and small-scale businesses.

2.2 Sampling Technique

A multi-stage sampling technique was utilized to select extension workers for this study. In the first stage, Bauchi was purposefully chosen from the North Eastern States of Nigeria due to the high number of extension workers and accessibility to them. In the second stage, Bogoro Local Government Area (LGA) was selected from the 20 LGAs in the state, again for

its abundance of extension work. In the third stage, seven villages within Bogoro were specifically chosen because of the high concentration of extension workers. Finally, in the fourth stage, a simple random sampling method was applied to select extension workers from the wards, ensuring an unbiased approach. From a sample frame of 220 extension workers, 141 were randomly selected as the final sample size. The sample size was calculated using Yamane's (1967) formula as used by Onwuaroh *et al.* (2017), assuming a 95% confidence level and a 5% sampling error.

$$n = \frac{N}{1+N(e)^2} \dots\dots\dots \text{Equation 2.1}$$

Where:

n= sample size (total sample size)

N= population size (total sample frame)

e= level of significance (set at 0.05 for this study)

$$\text{Sample frame of village} = \frac{\text{sample frame of village} \times \text{Total sample size}}{\text{Total sample frame}} \dots\dots\dots \text{Equation 2.2}$$

Table 2.1: Population and sample size of extension workers

State	LGA	Villages	***Sample frame	Sample size
Bauchi	Bogoro	45	29	
	Mwari	42	27	
	Gambar	23	15	
	Dazara	25	16	
	Tadnum/Banram	27	17	
	Gyara	30	19	
	Gobbiya	28	18	
Total		7	220	141

***Source: Bauchi State Agricultural Development Project (2022)

2.3 Analytical Techniques

Descriptive statistics, including frequency counts, tables, percentages, and means, were utilized to achieve the following objectives: i) to describe the socio-economic characteristics of extension workers, ii) to identify the preferred social media platforms used by extension agents, and iv) to identify the challenges faced by extension workers in using social media. Additionally, a binary logit regression model was employed to analyze objective iii which aimed to determine the socio-economic characteristics influencing the use of social media by extension workers.

The empirical model of specification is explicitly expressed as:

$$Y = \ln\left(\frac{P}{1-P}\right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_{67} + \beta_8 X_8 + \beta_9 X_9 + U_1 \dots\dots\dots \text{Equation 2.3}$$

$$\ln\left(\frac{P}{1-P}\right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_{67} + \beta_8 X_8 + \beta_9 X_9 + U_1 \dots\dots\dots \text{Equation 2.4}$$

(Sandun, 2023)

Where:

P = Probability of using social media

1-P= Probability of not using social media

ln = Log

Y = Social media usage by extension workers (usage=1, non-usage=0)

β_0 = Constant term

β (1,2,.....6)=Vector of the parameter to be estimated

X_1 = Age of extension agents in years

X_2 = Sex of the respondents (male=1, female=0)

X_3 = Marital status of the respondents (married=1, single, divorced or separated=0)

X_4 = Respondents level of education (informal=0, primary=1, secondary=2, tertiary=3)

X_5 = Household size (numbers)

X_6 = Income (naira)

X_7 = Years of work experience (years)

X_8 = Membership of cooperatives (yes=1, no=0)

X_9 = Farm size cultivated (hectares)

U_1 = Error term

3.0 Results and Discussion

3.1 Socio-economic Characteristics of Respondents

This section examines the social and economic characteristics of respondents, including age, gender, educational attainment, marital status, household size, and annual income. According to Table 3.1, 59.6% of extension workers in Bogoro L.G.A. are male, while 40.3% are female. The data reveals that the largest age group (44.66%) consists of respondents aged 51 to 60 years. In terms of marital status, 80.5% of the extension agents are married, and a significant majority (81.2%) has attained some form of tertiary education. This educational background suggests a solid foundation for implementing social media training aimed at disseminating agricultural information necessary for advancing the agricultural transformation agenda. Enhancing the knowledge and skills of extension workers through education is vital for achieving food security in Nigeria. These findings are consistent with the study by Uzoechi *et al.* (2022), which indicated that most extension workers are married, with 54.1% over the age of 40, and over 85% possessing some level of tertiary education. Similarly, Suleiman *et al.* (2021) and Akintunde (2023) found that a majority of extension workers are male, married, and hold tertiary degrees.

Table 3.1 also indicates that the average working experience of the extension agents is 24 years, with an average household size of 9 individuals and a mean annual income of N549,568. Approximately 97.2% of respondents earn between N401,000 and N700,000 annually. In comparison, Suleiman *et al.* (2021) reported an average working experience and household size of 17.2 years and about 12 individuals, respectively. Similarly, Uzoechi *et al.* (2022) found that most extension workers in their study earn between N400,001 and N800,000 annually. These findings further support the results of the current study.

3.2 Preferred Social Media Use by Extension Agents

Table 3.2 shows that, out of 109 respondents, 91 (83.49%) engaged with some form of social media, while 16.51% did not use it at all. This indicates that the majority of extension workers are active on social media. Further analysis in Table 3.3 identifies the preferred social media platforms among these 91 respondents, highlighting that Facebook is the most popular (100%), followed by WhatsApp (92%) and YouTube (61.54%). These platforms are widely recognized as the top choices for disseminating agricultural information, likely due to their user-friendliness and the ease of sharing content.

Table 3.1: Socio-economic Characteristics of Respondents (n=109)

Variables	Frequency	Percentage (%)	Mean
Sex			
Male	65	59.6	
Female	44	40.3	
Total	109	100	
Age(years)			
≤40	8	2.19	
41-50	24	15.34	
51-60	63	44.66	54.0years
61-70	14	33.97	
≤71	3	3.84	
Total	109	100	
Marital Status			
Single	21	19.5	
Married	88	80.5	
Total	109	100	
Education			
No formal education	3	3.29	
Primary education	5	1.92	
Junior secondary education	19	10.68	
Senior secondary education	2	3.29	
Tertiary education	83	81.2	
Total	109	100	
Household size			
0-5	20	18.3	
6-10	65	59.6	
11-15	15	13.7	9.0
≤15	9	8.2	
Total	109	100	
Working experience			
≤10	11	10.0	
11-20	15	13.7	
21-30	75	68.8	24years
≤41	8	7.3	
Total	109	100	
Annual income (Naira)			
300,000 - 400,000	3	2.8	
401,000 - 500,000	40	36.7	
501,000 - 600,000	21	19.3	₦549,568
601,000 - 700,000	45	41.2	
Total	109	100	

Source: Field survey, 2023

Table 3.2: Social Media Usage by Extension Workers

Usage of Social Media	Frequency	Percentage
Yes	91	83.49
No	18	16.51
Total	109	100

This finding aligns with Udoeye and Okoro (2024), which identified Facebook, YouTube, and WhatsApp as the most frequently used social media platforms among extension professionals. Additionally, Akintunde (2023) noted that many extension workers predominantly use WhatsApp and Facebook to effectively communicate technological advancements to farmers.

Table 3.3: Preferred Social Media Use by Extension Workers (n=91)

Social media preference	*Frequency	Percentage (%)
Facebook	91	100.0
Whatsapp	84	92.31
Youtube	56	61.54
Twitter	31	34.06
Telegram	36	39.56
Likedln	12	13.19
BBM	2	2.20
Instagram	2	2.20
Yahoo messenger	22	24.18
Total	*336	*369.24

Source: Field survey, 2023

*=Multiple responses

3.3 Factors Influencing Usage of Social Media in Agriculture by Extension Workers

The logit regression results provided ratios that illustrated the influence of various socioeconomic characteristics on social media usage. According to the logit regression presented in Table 3.4, the chi-square statistic of 58.78 is significant at the 1% level, indicating that the model is statistically valid. This suggests that the independent variables have a strong influence on the dependent variable, thereby confirming that the socio-economic factors significantly influence extension agents' use of social media to engage with farmers.

The results indicated that age had a negative and statistically significant relationship with social media usage at the 1% level. Specifically, each additional year in age was associated with a 0.142 decrease in the likelihood of using social media. This suggests that as an individual increases in age, the propensity to use social media does decline. This is supported by Khan *et al.* (2016), who found a significant negative correlation between age and internet usage, indicating that older individuals tended to use the internet less. Additionally, Adebayo (2017) reported an inverse relationship between age and the extent of media tool usage, suggesting that younger individuals are generally more open to new ideas and innovations

than their older counterparts. However, this finding contradicts Nwanko and Anyanwu (2021), who noted a positive relationship between age and social media usage.

Furthermore, the results indicated that education had a positive and statistically significant relationship with social media usage at the 5% level. Specifically, each additional unit of education was associated with a 0.807 increase in the likelihood of using social media. This is not surprising, given that the majority of respondents had tertiary education, which equipped them with the literacy skills necessary to effectively utilize social media platforms. The use of social media tools tends to increase with higher levels of education, suggesting that individuals with greater educational attainment are more likely to adopt technology. More educated workers are generally more knowledgeable about utilizing social media for acquiring and disseminating agricultural information, as education often correlates with greater exposure to relevant knowledge. This finding is consistent with Bamiro and Oyetoki (2019), who demonstrated a positive relationship between education and the ability to use ICT. Additionally, Baye (2016) found education to be significant in social media usage, and Abdullahi (2020) reported that educational qualifications influence social media engagement.

Table 3.4 Factors influencing usage of social media by agricultural extension workers

Social Media Usage	Coef.	Std. Err.	z	P> z 	[95% Conf. Interval]	
Sex(male)	1.402415	.6921613	2.03	0.043**	.0458034	2.759026
Educational Level	.8064767	.3188558	2.53	0.011**	.1815309	1.431423
Age	-.1422123	.0397072	-3.58	0.000***	-.220037	-.0643876
Marital Status	-.164951	.8001709	-0.21	0.837	-1.733257	1.403355
Years of work experience	.128926	.0613723	2.10	0.036**	.0086385	.2492135
Membership of cooperative	-.5682102	.6368419	-0.89	0.372	-1.816397	.6799769
Income level	-.1001424	.1257086	-0.80	0.426	-.3465267	.1462418
Household size	-.0587602	.0670232	-0.88	0.381	-.1901233	.0726029
Farm size	.0828185	.5008697	0.17	0.869	-.898868	1.064505
_cons	2.6523	1.546093	1.72	0.086	-.3779871	5.682587

Source: Field survey, 2023, **significant at 5%, ***significant at 1%

Number of obs = 109
 LR chi2(9) = 58.78
 Prob> chi2 = 0.0000
 Pseudo R2 = 0.4170
 Log likelihood = -41.090323

Furthermore, the results indicate that working experience had a positive and significant relationship with social media usage at the 5% level. Specifically, each additional year of experience is associated with an increase in social media use by a factor of 0.1289. This suggests that more experienced workers are more likely to use social media for agricultural information compared to those with less experience. This finding agrees with Adebayo (2017), who reported a positive relationship between working experience and the use of

Table 3.5: Challenges encountered in the use of social media by extension workers

Challenges	Frequency	Percentage
Poor Network		
Yes	91	83.5
No	18	16.5
Total	109	100
High Cost of Accessing social media by farmers		
Yes	90	82.6
No	19	17.4
Total	109	100
High Illiteracy level of farmers		
Yes	40	56.7
No	69	63.3
Total	109	100
Low participation by farmers		
Yes	59	54.1
No	50	45.9
Total	109	100
No electricity supply		
Yes	76	69.7
No	33	30.3
Total	109	100
Inadequate training of extension agents on use of social media		
Yes	74	67.9
No	35	32.1
Total	109	100

Source: Field survey, 2023

cyber-extension facilities. The coefficient for sex was positive and significant at the 5% level, indicating a direct relationship between gender and social media usage. Specifically, male extension workers are 1.402 times more likely to engage with social media than their female counterparts, suggesting that males generally utilize social media more effectively.

The study by Alhassan *et al.* (2023) highlighted age, education, and gender as socio-economic factors influencing social media usage, which supports the findings of the current study.

3.4 Challenges Encountered in the Use of Social Media by Extension Workers

Table 3.5 outlines the challenges extension workers face in using social media within the Bogoro Local Government Area of Bauchi State. Respondents identified several significant obstacles: poor network connectivity (83.5%), high costs for farmers to access social media (82.6%), a high illiteracy rate among farmers (56%), low participation from farmers (54.1%),

lack of electricity supply (69.7%), and insufficient training for extension agents on social media use (67.9%). These findings align with Uche and Fan (2018), who noted that key challenges include operational skills and the high costs associated with accessing technology like phones or laptops, which often require electricity that is frequently unavailable or unreliable.

4.0 Conclusion and Recommendations

In conclusion, the study revealed that extension work in the area is predominantly carried out by male, educated, married individuals with significant experience and larger household sizes. The preference for social media platforms like Facebook, WhatsApp, and YouTube indicates that these extension workers acknowledge the role of social media in enhancing farmers' livelihoods. Factors such as education, gender, and years of work experience were found to significantly and positively influence social media usage, suggesting that less educated, less experienced, and female extension agents may be less likely to engage with these tools.

Furthermore, the main challenges faced by extension workers included poor network connectivity and high costs associated with accessing social media. On-going issues with funding and connectivity are likely to hinder these agents from effectively utilizing social media, highlighting the need for targeted interventions to address these barriers.

It is recommended that governments at all levels implement policies to improve the welfare of extension workers, encouraging more individuals to pursue careers in this field. Additionally, both the government and NGOs should invest in enhancing network connectivity to support effective social media usage. Increased efforts in power generation and distribution are also essential for improving the country's electricity situation. Finally, it is suggested that the government and relevant stakeholders organize workshops, seminars, and training sessions for extension workers to enhance their capacity to disseminate agricultural information effectively.

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