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Effectiveness of social media in enhancing communication among farmers in Sokoto state, Nigeria

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ABSTRACT

Social media is a powerful communication tool that can be used in agricultural extension and advisory services to disseminate content and lead horizontal conversations among experts and farmers alike. Thus, the present study was conducted to assess the effectiveness of social media for communication among farmers in Sokoto state, Nigeria. Primary data were obtained using a questionnaire administered to 151 respondents selected through simple random sampling from a sampling frame of registered e-extension farmers. Data were analyzed using descriptive and inferential statistics (Pearson Product Moment Correlation). Results revealed that the majority (73.56%) of respondents had a secondary school certificate, with an average household size of 8 and a mean annual income of ₦412,218.54 (\$304.93). They had averagely spent 10.4 years engaged in farming. Facebook was mostly used by majority (54%) of the respondents among other social media to communicate with fellow farmers on issues centred on crop production (41.72%), pest and disease control (15.90%), agricultural credit facilities (15.23%), and livestock production (12.58%), for an average of 7.39 years. Social media was reported as effective (35%) or highly effective (65.00%) for communication among farmers. However, communication was constrained by poor network (43.05%), lack of quality control (22.52%), cost of data (18.54%), and poor electricity supply (15.89%). A moderately significant positive association was found between educational level ($r = 0.386$, $p < 0.001$), annual income ($r = 0.430$, $p < 0.001$), and the effectiveness of social media for communication among farmers. Hence, extension service providers need to further explore social media for better delivery.

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Introduction

Social media has become a powerful tool that connects millions of people globally from the comfort of their homes, thereby revolutionizing and bringing new ways of communication and exchange of information (Kipkurgat et al., 2016). The rapid growth to 2.56 billion social media users worldwide, accounting for roughly 68% of all internet users, demonstrates the revolutionary elements of social media (Ghosh et al., 2021). It facilitates exchange of knowledge, thoughts, and information by allowing users to create audio and video communities and networks (Keshewani et al., 2022). It also allows people who were formerly limited to the receiving end of communications to be more participatory (Darshan & Suresh, 2021). Agriculturalists are joining the conversation and communicating via social media, which allows users to display information in real time and free of charge (Barbassa, 2010).

Social media is becoming a very important tool in farming because it has the ability to connect farmers and agribusiness people from around the world over large geographical distances (Jiriko et al., 2020). It plays a very important role in enhancing interactions and information flow among different actors involved in agricultural innovation and also enhances the capacities of agricultural extension and advisory service providers (Chui et al., 2012). Information and communication technologies (ICTs) such as social media have provided new ideas, methods, and techniques for disseminating and improving knowledge

and information among people of different societies. These technologies, if properly and adequately used by farmers in Nigeria, will increase their access to agricultural information, making them more efficient (Otene et al., 2018). As a by-product of the internet, they have transformed the world into what can now be referred to as an “information society”, with high-tech communication permeating almost every aspect of human life (Ebo et al., 2012).

However, farmers remain the primary producers of food for the populace. As such, efforts are being made by different stakeholders, including the farmers themselves, to enhance effective continuity of food production. Among these efforts is the dissemination of vital information to farmers regarding interventions, modernized techniques, input support, etc., through any means necessary, with the objective of increasing food production. Social media provides an opportunity to link and network with one’s peers and other audiences in farming, and to advise and provide assistance on how to improve production (Jiriko et al., 2020). It makes promotion of extension programmes faster, allows real-time communication with clienteles, helps facilitate outreach to different audiences, and expands relationships among actors in agricultural innovation systems (Cornelisse et al., 2011).

A number of studies (Jijina & Raju, 2016; Thomas et al., 2016; Ghosh et al., 2021) have investigated the perspectives of farmers

and extension workers on social media used in agricultural extension service delivery. However, no study available in the public space has assessed the effectiveness of social media specifically for communication among farmers (horizontal communication) as distinct from extension-to-farmer communication. This gap the present study aims to fill.

In view of the above circumstances, the present study has been undertaken with the following specific objectives to: i) describe the socio-economic characteristics of farmers using social media to communicate among themselves in the study area; ii) identify the social media platforms used for communication among farmers; iii) determine the effectiveness of social media for communication among farmers; iv) find out the constraints faced by farmers in using social media to communicate among themselves; and v) ascertain the association between educational level, annual income, farming experience, household size, and the effectiveness of social media in communication among farmers.

Materials and Methods

Study area

The study was conducted in Sokoto state, Nigeria. Sokoto is located on latitude N 12° 56' 14.7336" and longitude E 5° 13' 36.0012". It has a population of 3,702,676 (NPC, 2006) on a landmass of 25,973 km². The state is generally agrarian, with the bulk of its population engaged in smallholder farming, largely cultivating crops and rearing animals for local consumption.

Sampling procedure and sample size

The sampling frame consisted of registered e-extension farmers of the Sokoto Agricultural Development Project (ADP), Sokoto State, Nigeria. This frame includes farmers who have voluntarily registered to receive digital extension services. A simple random sampling technique was used to select 151 respondents for the study.

Data collection and analysis

Data were collected using a structured questionnaire and analyzed using both descriptive statistics (frequencies, percentages, means) and inferential statistics (Pearson Product Moment Correlation).

Measurement of effectiveness

To determine the effectiveness of social media used in communication among farmers, respondents were asked to rate each social media platform on a 4-point scale: 3 = highly effective, 2 = effective, 1 = less effective, 0 = not effective. Based on the respective scores of each social media platform on each point of the scale, frequency and percent were computed. A cumulative effectiveness score was then computed for each respondent by summing scores across all platforms. The minimum score was 0 and the maximum was 21 (7 platforms × 3). Based on the cumulative scores, respondents were categorized as: highly effective (15-21), effective (8-14), or less effective (≤ 7).

Results and Discussion

Socio-economic characteristics

Table 1 shows that the majority of respondents had attended secondary school (73.56%), which implies an optimum level of literacy and knowledge sufficient to use social media for accessing agricultural information that could improve farm productivity.

The mean annual income was ₦412,218.54 (\$304.93), confirming that farmers in the study area are mainly smallholders. This is consistent with Otene et al. (2018), who

reported that smallholder farmers do not earn much from their farms. Similarly, the average household size was approximately 8 persons, corroborating Jiriko et al. (2018).

Most (73.51%) respondents had 2-7 years of farming experience, with a mean of 10.4 years. According to Dossah and Mohammed (2016), the more frequently a person performs a job, the better they become at it. Thus, greater farming experience likely enhances farmers' ability to make important decisions to improve their enterprises.

Table 1. Distribution of respondents based on socio-economic characteristics (n=151)

Variable	Frequency	Percent
Education Level		
Primary	25	16.56
Secondary	111	73.56
Tertiary	15	9.93
Annual Income (₦)		
30,000-624,000	115	76.16
624,001-1,218,000	29	19.21
1,218,000-1,812,000	5.0	3.31
1,812,000-2,406,000	1.0	0.666
2,406,001-3,000,000	1.0	0.66
Mean	412,218.54	
Household size (number)		
2-7	80	52.98
8-12	45	29.80
13-17	13	8.61
18-22	13	8.61
Mean	8.23	
Farming experience (years)		
2-7	111	73.51
8-12	29	19.21
13-17	8.0	5.30
18-22	3.0	1.99
Mean	10.4	

Social media use in communication

Table 2 reveals that the majority (54.30%) of respondents use Facebook for communication among themselves, followed by WhatsApp (31.13%). Other platforms, including YouTube (1.32%), Telegram (0.66%), and Instagram (0.66%), were rarely used. Farmers spent an average of 7.39 years

using social media, exchanging information on crop production (41.72%), pest and disease control (15.90%), agricultural credit facilities (15.23%), and livestock production (12.58%). Only 1.32% communicated about market prices. This low attention to market price information is consistent with Thomas *et al.* (2016) in Kenya, who found similar

Table 2. Distribution of respondents based on social media use in communication (n=151)

Variable	Frequency	Percent
Social media used for communication		
Facebook	82	54.30
Twitter	0	0
YouTube	2.0	1.32
WhatsApp	47	31.13
Telegram	1.0	0.66
Instagram	1.0	0.66
LinkedIn	0	0
Social media usage duration (hours)		
2-7	80	52.98
8-12	60	39.74
13-17	7.0	4.64
18-22	4.0	2.65
Mean	7.39	
Information communicated		
Crop production	63	41.72
Livestock production	19	12.58
Pest and disease control	24	15.90
Fertilizer availability and application	10	6.62
Agriculture credit facility	23	15.23
Market price	2.0	1.32
Improved seed varieties	10	6.62
Factors influencing the use of social media for communication		
Self-influenced	74	49.0
Neighbors	9.0	5.96
Local leader	2.0	1.32
Extension worker	16	10.60
Fellow farmers	5.0	3.31
My children	44	29.80

patterns among smallholder farmers who often lack direct market access. Respondents were primarily self-influenced (49.0%) or encouraged by their children (29.80%) to use social media, suggesting that younger family members play a key role in digital technology diffusion among older farmers.

Effectiveness of social media for communication among farmers

Table 3 presents platform-specific effectiveness ratings. Facebook was rated as highly effective by 96.69% of the respondents, confirming its dominance and utility. This dominance can be explained by Facebook's lower data consumption compared to video-based platforms and its widespread familiarity

among Nigerian users. WhatsApp also showed high effectiveness (92.72% highly effective). Only platforms actually used by respondents are reported; platforms with zero users (Twitter, LinkedIn, as indicated in Table 2) are omitted from Table 3.

The cumulative effectiveness scores (Table 4) show that 65% of respondents found social media highly effective and 35% effective for communication among farmers. No respondent fell into the "less effective" category. These findings are similar to Roy (2018), who reported high effectiveness of social media as an emerging marketing tool in Kerala, India, suggesting that social media's utility transcends geographic and sectoral boundaries.

Table 3. Distribution of respondents based on perceived effectiveness of social media platforms used for communication

Platform	Highly Effective (%)	Effective (%)	Less Effective (%)	Not Effective (%)
Facebook (n=82)	96.69	3.31	0	0
WhatsApp (n=47)	92.72	7.28	0	0
YouTube (n=2)	40.39	58.28	1.32	0
Telegram (n=1)	25.17	58.94	15.89	0
Instagram (n=1)	21.85	36.42	0	0

Note: Platforms with zero users (Twitter, LinkedIn) are omitted from this table. Percentages are based on the total sample (n=151) for comparison.

Table 4. Distribution of respondents based on cumulative effectiveness of social media (n=151)

Effectiveness category (cumulative score range)	Frequency	Percent
Highly effective (15–21)	98	65
Effective (8–14)	53	35
Less effective (≤ 7)	0	0

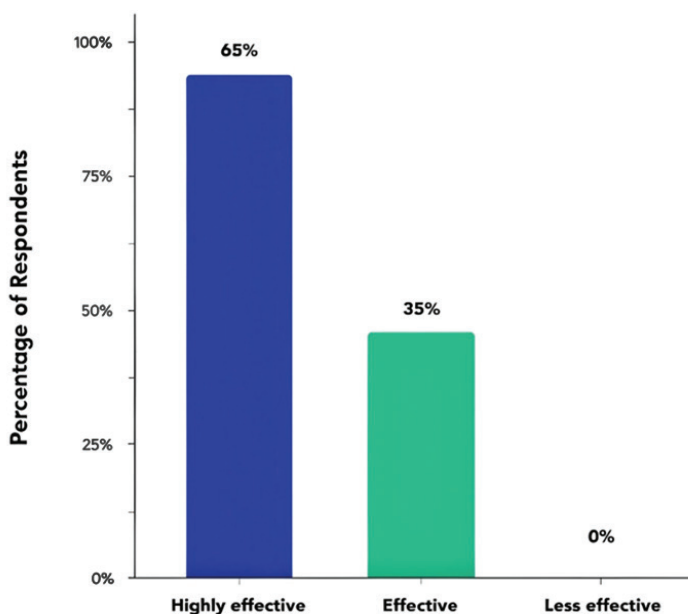


Fig. 1 presents the distribution of cumulative effectiveness scores graphically, visually confirming that all respondents rated social media as either effective or highly effective for communication among farmers.

Table 5. Distribution of respondents based on constraints faced in using social media (n=151)

Constraint	Frequency	Percent
Poor network	65	43.05
Poor electricity supply	24	15.89
Cost of data	28	18.54
Lack of quality control	34	22.52

Constraints faced by respondents in using social media for communication with fellow farmers

Poor network (43.05%) was the major constraint faced by respondents while using social media to communicate with fellow farmers. This was similarly observed in Kesse district, Kenya, by Thomas et al. (2016), indicating that infrastructure deficits are a

cross-cutting challenge in sub-Saharan Africa. Other constraints included lack of quality control (22.52%), cost of data (18.54%), and poor electricity supply (15.89%). This finding is substantiated by Adam et al (2026), who identified poor services, high charges, network problems, and interconnectivity difficulties as barriers to effective ICT use in agricultural extension.

Table 6. Association between educational level, annual income, household size, farming experience, and effectiveness of social media in communication among farmers (PPMC)

Variable	Correlation coefficient (r)	p-value	Remark
Educational level	0.386	0.000***	Significant
Annual income	0.430	0.000***	Significant
Farming experience	-0.042	0.604	Not Significant
Household size	0.043	0.601	Not Significant

*** $p < 0.01$

Association between educational level, annual income, household size, farming experience, and effectiveness of social media in communication among farmers

In order to determine the association between the effectiveness of social media for communication among farmers and the selected socio-economic variables, Pearson Product Moment Correlation (PPMC) analysis was carried out. The results are presented in Table 6.

Results in Table 6 show that educational level (years of schooling) had a positive and moderately significant association ($r = 0.386$, $p < 0.001$) with the effectiveness of social media for communication among farmers. As the educational level of the farmer increases, they experience greater effectiveness of social media in communication with other farmers. This is likely due to higher literacy, digital skills, and ability to critically evaluate online information. That agrees with the opinion of Ahmadu (2006), who stated that the relevance of education in production business cannot be overemphasized.

Likewise, annual income had a moderately significant positive association ($r = 0.430$, $p < 0.001$) with the effectiveness of social

media for communication among farmers. It suggests that as the annual income of respondents increases, the effectiveness of social media in communicating among farmers increases. This could be influenced by the rise in purchasing power of farmers, enabling them to afford data subscriptions, better smartphones, and more reliable internet access, which has a positive effect on their livelihood and other activities.

Both farming experience ($r = -0.042$, $p = 0.604$) and household size ($r = 0.043$, $p = 0.601$) had a non-significant and weak association with the effectiveness of social media for communication among farmers. This suggests that these variables are not significantly associated with how effective farmers perceive social media to be for their communication needs.

Conclusions

Employing social media for communication in today's information age is inevitable. The present study concludes that social media is generally effective for communication among farmers in Sokoto State, with Facebook being the most commonly used and most

effective platform. Information exchange primarily focuses on crop production, pest and disease control, agricultural credit facilities, and livestock production, with market price information notably neglected. Higher educational level and annual income are associated with greater perceived effectiveness. However, poor network, lack of quality control, cost of data, and poor electricity supply remain significant constraints.

Implications for extension: Extension service providers should further explore social media, particularly Facebook and WhatsApp, for better delivery of agricultural information. Targeted content on market prices should be developed, given the current neglect. Furthermore, stakeholders should advocate for improved rural network infrastructure and electricity supply to enhance the effectiveness of social media-based communication among farmers.

Limitations of the study: The sampling frame was limited to registered e-extension farmers of the Sokoto Agricultural Development Programme, who may have higher digital literacy and better access to technology than the average farmer in the state. Additionally, the effectiveness measure was based on self-reported perception.

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Conflict of Interest

The authors declare no conflict of interest in this work

Author Contributions

Conceptualization: Aliyu Akilu Barau: Conceptualisation, Methodology, Validation, Resources, Data curation, Visualization, Supervision, Review, and Editing. Onakpa Daniel Friday: Data collection and Preparation of the initial draft.

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