An Assessment of Socioeconomic Determinants of Willingness to Adopt Social Media as Agro-Communication Channel Among Farmers in Gombe State, Nigeria

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Abstract

The study assessed farmers' willingness to adopt social media as agro-communication channels in rural communities of Gombe State, Nigeria. Multistage sampling technique was used to select 283 respondents for the study. Primary data for the study were obtained with the standard questionnaire which was scripted on Google form. The data were analysed with the aid of frequency distribution and Likert rating scale. Binary logistic regression was used to test the hypothesis for the study. Findings revealed that the majority of the farmers were males (77.39%), aged from 33 to 40 (37.46%), married (78.8%), and dominant household size of two to six (56.54%). Most of the farmers had secondary education (41.34%), were members of cooperative or social groups (74.2%) and had extension agents' visit (63.6%). Majority also had credit access (75.62%) and were computer-literate (57.95%).The overall mean extent of knowledge of social media was low (2.02) among the farmers. Majority (68.55%) of the respondents indicated willingness to adopt social media as agro-communication channels. The binary logistic regression result, whose Pseudo R2 was 0.3029, shows that sex (-2.21), education (4.41), membership of cooperative society (-2.98), and the number of extension agents' visit (4.66) significantly affected the probability of adopting social media as agro-communication channels. It was concluded that farmers are willing to adopt social media as channels of agro-communication. It was recommended that the Gombe State Agricultural Development Programme (ADP) should educate farmers on the various social media channels so as increase rural farmer's knowledge of available social media channels and consequently facilitate their adoption of social media as agro-communication channels. In addition, the National Agricultural Extension Research and Liaison Services should collaborate with the Gombe State ADP to campaign for the adoption of social media as agro-communication channels among farmers in rural communities.

Introduction

Agriculture is an important source of food for man, feed for livestock and raw materials for industries. In developing countries, Nigeria in particular, the sector is the major employer of labour and driver of the economy. Due to changes surrounding agricultural production and the scarcity of the primary factors of production including land, labour, capital, management and the need for quality agricultural produce to meet the ever-increasing consumer demand, there is need for adequate access to agricultural information through proper and available communication channels that is affordable to farmers in Nigeria [1].

Timely access to agricultural information among farmers is important to assist them to make rational decisions related to agricultural activities. Various channels are used to disseminate agricultural information to farmers, the most traditional but still most used among farmers in rural communities of most developing countries is the face-to-face communication. With this channel of communication, different modes such as facial expressions, gestures, intonation, words and body language can be employed to convey a single message. It also enhances immediate feedback because the communicating parties are in the same physical location. However, the channel is known for its shortcoming of distorting messages as they are passed from one person to. Most recently, other channels of communication used for disseminating agricultural information modern called the social media are Youtube, Whatsapp, Researchgate, Facebook and Twitter.

Advancement in technology has brought about new communication channels which are either stand alone or mediated communication devices. These channels include the print media, demonstrations; different mobile phone applications, radio and television sets and web based which includes social media channels. Decision on which communication channel to use depends on the awareness and credibility of the media, media richness, characteristics of the message being communicated, availability of feedback mechanism and urgency of the message. Moreover, the quality of the communication infrastructure being used for transferring a message affects the level of usage of some communication channels. For example, the quality of roads can affect the transfer of print media while that of ICT networks affects the adoption and usage of radio and television sets, web-based media and mobile phones. Strategies employed in communicating agricultural information may differ by type of information being communicated, credibility of the channel, level of development of the communication infrastructure, rural-urban settings, intended audience, dispersion of the intended audience and literacy level of the intended audience. It is for these factors that some communication channels may have a lot of advantages compare to others.

Despite the advocacy for the use of social media to quicken the spread of information and attendant advantages of information dissemination through social media, not all farmers are likely to adopt this innovation. This because rural farmers are averse to new technologies due to limited exposure and apprehension. Generally, the laggards always drag their feet in catching with innovations. It was to this extent that this study was designed to fathom the reasons for their willingness or unwillingness to adopt social media as an agro-communication channel.

In order to address these problems, some objectives were raised for the study. These were to describe the socioeconomic characteristics of farmers in Gombe State, assess the extent of knowledge of social media channels and determine the level of willingness to adopt social media as agro-communication channel among the farmers. It was hypothesized that farmers' socioeconomic characteristics have no significant effect on their willingness to adopt social media as agro-communication channels.

Materials and Methods

The study area was Gombe State. The State is located in the North Eastern Nigeria, it shares boundaries with Borno State and Yobe, in the North, Taraba, in the South, Adamawa, in the Southeast and Bauchi State in the west. Gombe State was formed from Bauchi State on 1 October 1996. Gombe is the 21st largest state in area and 32nd most populous with an estimated population of about 4.65 million people as at National Bureau of Statistics [2]. Geographically, the state is within Latitude: 10° 16' 60.00" N and Longitude: 11° 09' 60.00" E. Gombe State is inhabited by various ethnic groups, primarily the Fulani people living in the north and centre of the state along with the Bolewa, Kanuri, and Hausa peoples while the state's diverse eastern and southern regions are populated by the Cham, Dadiya, Jara, Kamo, Pero, Tangale, Tera, and Waja peoples. Gombe State is largely based around agriculture as the mainstay of the major crops mainly grown in the State are sorghum, groundnuts, millet, tomatoes, and yams. Livestock include Cattle, sheep, goats and poultry with tree cops such as Mango and Cashew.
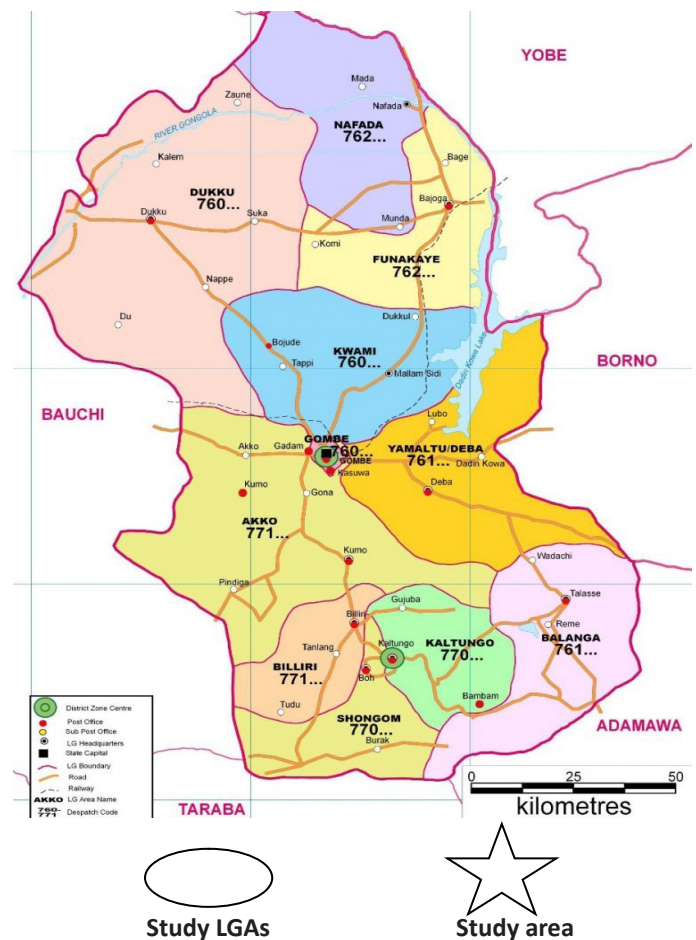

Figure 3.1: Map of Gombe showing the study area
Source:www.gombe.map.org (2022).

Population, sampling technique and sample size

The population for this study comprises all farmers in the study area. Due to the large population which would make it difficult to reach all of them, a multistage sampling technique adopted to select respondents for the study.

Stage 1: This stage involved a purposive selection of two (2) Local Government Areas from each of the three (3) Agricultural Zones in the State to give a total of six (6) Local Government Areas. These are Akko and Yamaltu-Deba from Gombe Central, Kaltungo and Balanga from the South and Kwami and Nafada from the North. The reason for purposive selection is to ensure that Local Government Areas only well-known for Agricultural production were selected.

Stage 2: In this stage two, some communities were purposively selected from each of the six (6) Local Government Areas to give a total of twelve (12) communities. The purposive selection is to further ensure that in the Local Government Areas, communities well-known for farming activities were selected.

Stage 3: In the third stage, from the list of registered farmers obtained from the Gombe Agricultural Development Programme, Taro Yamane formula was applied to scientifically determine the sample size. The Taro Yamane's formula is specified as follows:

n = N/ 1+ N(e)²

where,

n = the required sample size from the population under study

N = the whole population that is under study

e = the precision or sampling error which is 0.05

The application of Taro Yamane's formula produced a sample size of 283 farmers.

Bourley's formula was then applied to distribute the sample among the communities. The formula is specified as follows:

$$n_h = \frac{N_h}{N} \times n$$

Where,

n_h = sample size for the stratum h

N_h = population size for the stratum h

N = total population

n = total sample size

The outcome of the application of Taro Yamane and Bourley's formulae is presented in Table 1.

Validity and reliability of research instrument

Content validity was used. It was done by passing it through the supervisory team in the Department of Agricultural Economics and Extension, Faculty of Agriculture, Lafia, Nasarawa State University, Keffi. Their independent opinions on the adequacy and relevance of the research instrument were incorporated into the instrument to ensure that it possessed content validity.

Table 1: Sampling Frame and Sample Size Distribution.

S/No	Communities	LGA	Population	Sample
1	Kashere	Akko	88	26
2	Kumo	Akko	84	25
3	Deba	YamaltuDeba	82	24
4	Dadin - Kowa	YamaltuDeba	88	26
5	Abuja Bula	Kwami	74	22
6	Gulde	Kwami	80	23
7	Nafada	Nafada	78	23
8	Ashakka	Nafada	74	22
9	Kaltungo	Kaltungo	75	22
10	Pkaganje	Kaltungo	80	23
11	Talasse	Balanga	85	25
12	Lunguda	Balanga	76	22
	TOTAL		**964**	283

Source: GSADP, 2022

The instrument was trial-tested. The data from the trial-testing were subjected to Cronbach's Alpha coefficient. The overall coefficient showed that the instrument possessed internal consistency.

Method of data collection

Primary data were used for the study. The data were collected through the use of structured questionnaire. The primary data collected include socio-economic characteristics of the respondents, extent of knowledge of social media channels, extent of need for agricultural information from social media sources, willingness to adopt social media as agro-communication channel, and challenges against the adoption of social media as agro-communication channel.

Data analysis

Data were analyzed using both descriptive and inferential statistics. The descriptive statistics used include frequency, percentage mean scores from a five-point likert rating scale. The descriptive statistics were used to achieve objectives i, ii, iii, iv and v. Logistic regression analysis as used by [3,4], was used to test hypothesis one. Mann-Whitney (U) statistic was used to test hypotheses two and three

Model Specification

The Logistic model is as used by [4]. The implicit model is shown in (1)

$$ln\frac{P_i}{1-P_j} = Z_i = \alpha + \sum X_i + e_i \qquad (\text{Eq 1})$$

The model is a cumulative logistic probability function. The significance of each factor is influenced by the coefficient of probabilities within a (1, 0) range interval to the problem of predicting odds of events occurring within the range of a real line. The estimated model is specified as follows.

$$z_i = ln\frac{P}{1-P} = lnY = b_0 + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + b_5x_5 + b_6x_6 + b_7x_7 \qquad (\text{Eq 2})$$

Where,

Z_i = Farmers' willingness to adopt social media as a channel for disseminating agricultural information (1= willing, 0= otherwise)

X_1 = Age of respondents (the numerical number of years the respondent has)

X_2 = Years of experience (No. of years in farming)

X_3 = Education Level (Years spent in formal education)

X_4 = Household size (No of persons)

X_5 = Cooperative membership (yes = 1, no= 0)

X_6 = Farm size (size of land in hectares)

X_7 = Extension contact (Number of contacts in a year)

b1 – b7 = regression coefficients

e = error term

Results & Discussion

Sex

The result of socioeconomic characteristics of the respondents, as presented in Table 2, shows that 77.39% of the farmers were males while 22.61% were females. This means that majority of the farmers were males. The male dominance reflects the cultural practice of the people of Gombe State where males are household heads and owners of assets, including farms. In addition, the dominant Islamic religion restricts access to females. The male dominance is in consonance with [5], who found that male farmers constituted 92% whereas female farmers made up only 8.0% in a study was conducted in Nasarawa State. In addition, farming generally is tedious and consequently an easier occupation of the men.

Age

The result also shows that the maximum age group of the respondents ranged from 33 to 40 (37.46%), while the minimum age group was between 57 and 65 (1.06%). This means that majority of the respondents were aged between 33 and 40, with an average of 37 years. This average age or dominant age group in the study implies that most of the farmers were relatively young and inquisitive enough to search for and embrace information from the social media for agricultural production activities. The young people have the time to browse the internet for information that are relevant to their livelihood activities. In other words, younger farmers also have a greater tendency to use social media, as it is most convenient for them. This dominant age group, according to Ibeagwa (2021), is also the most active age group in Nigeria. The finding is also in line with [3] who found 35 as the mean age in a study of constraints to use of social media in accessing agricultural information among crop farmers in Makurdi Local Government Area of Benue State, Nigeria.

Marital status

The analysis of marital status shows that while 78.8% of the respondents were married, 21.2% were single. This implies that most of the respondents were married. This is typical of a rural setting in Nigeria where farmers marry quite early to raise people who would support their farm work. This is in line with [3] who reiterated that most rural farmers rely on household for free family labour.

Household size

The result also shows that majority of the respondents (56.54%) had household of two (2) to six (6) while the least (1.41%) had between 17 and 21 members of household. In a rural and farming setting, household size has implication for provision of cheap and readily available labour for farm work. According to Lambrecht et al. (2014), large farm size enhances adoption of practices that would facilitate farm work. This result is less than the nine that was found by [3].

Level of education

The result in Table 2 shows that respondents with secondary education constituted 41.34%. Those with tertiary, non-formal and primary education constituted 24.38%, 18.02% and 16.25%, respectively. This means that majority of the respondents are largely educated. A high level of education enables familiarity with social media and adoption of same as agro-communication channels. The result also implies that educated people have taken to farming. The finding in this study is similar to [3] who reported that majority of the respondents in a social media study had formal education.

Membership of cooperative or social group

The result in Table 2 shows that majority (74.2%) were members of cooperative or social groups while 25.8% did not belong to any of such groups. Current information exchange is one of the benefits of joining social groups. Therefore, most of these respondents belong to groups of people where innovations that would help farming activities are shared at physical meetings. However, the recent outbreak of COVID-19 pandemic drastically reduced physical contact and consequently threw up social media as alternative meeting platforms. The finding is also in line with [3] that majority of the respondents belonged to one social group or the other.

Extension agent visit

The result further shows that majority (63.6%) of the respondents had visit from extension agent, while 36.4% were not visited by extension agents. Visit from extension agents is important for the dissemination of relevant innovation about modern farming and productivity. Hence, most of the respondents in this study had the opportunity of receiving the latest information from extension agents when they visit physically. Given the inadequacy of extension agents to meet up with the teeming number of farmers, increasing need for extension agents among farmers, current spate of insecurity and their wide geographical spread, the tendency for adopting social media as agro-communication channels would be a welcome development. This finding is at variance with Ibeagwa et al. (2021) who found that majority of the male vegetable farmers in Imo State were not visited by extension agents.

Access to credit

The result in Table 21 further reveals that while 75.62% have access to credit while 24.38% did not have access to credit. Therefore, majority of the respondents had access to credit. Access to credit enables farmers to acquire inputs and innovations. With credit, they can easily access various social media platform for information on agricultural production. Credit can help to ease the difficulty in acquiring mobile phone [6]. In addition, credit access can facilitate data subscription that would enable attendance of important meetings and workshops from the comfort of the homes of the farmers.

Table 2: Socioeconomic Characteristics of Farmers (n = 283).

Socioeconomic Characteristics	Frequency	Percentage (%)	Mean
Sex			
Male	219	77.39	
Female	64	22.61	
Age (years)			
25 to 32	78	27.56	37.40
33 to 40	106	37.46	
41 to 48	77	27.21	
49 to 56	19	6.71	
57 to 65	3	1.06	
Marital status			
Married	223	78.8	
Single	60	21.2	
Household size			
2 to 6	160	56.54	6
7 to 11	81	28.62	
12 to 16	27	9.54	
17 to 21	4	1.41	
22 to 26	11	3.89	
Highest level of education			
Non formal	51	18.02	
Primary	46	16.25	
Secondary	117	41.34	
Tertiary	69	24.38	
Farm size			
2 to 10	169	59.72	
11 to 19	81	28.62	
20 to 28	25	8.83	
29 to 37	7	2.47	
38 to 46	1	0.35	
Membership of cooperative or social group			
Member	210	74.2	
Non member	73	25.8	
Extension agent visit			
Not visited	103	36.4	
Visited	180	63.6	
Number of extension agents visit			
Not applicable	103	36.4	
1 to 2	170	60.07	
3 to 4	4	1.41	
5 to 6	1	0.35	
7 to 9	5	1.77	
Ymc			
Not applicable	59	20.85	
1 to 12	216	76.33	
13 to 24	6	2.12	
25 to 36	1	0.35	
37 to 48			
49 to 60	1	0.35	
Access to credit			
Yes	214	75.62	
No	69	24.38	
Computer literacy			
Computer literate	164	57.95	
Non computer literate	119	42.05	

Source: Field Survey, 2023

Computer literacy

The result in Table 2 also shows that 57.95% of the respondent were computer-literate while 42.05% were not computer literate. This means that majority of the respondents were computer literate. Computer literacy reduces the limitations that farmers encounter [7]. Stated that lack of computer skills can also be a limitation to small holder farmers. This becomes critical if they have to join important discussions remotely.

Extent of Knowledge of social media channels

The result of the extent of knowledge of available social media channels of communication is presented in Table 3. On a five-point likert scale, the result shows that WhatsApp had the highest mean score of 3.46. This means that, of the available social media channels of communication, the respondents had a very high level of knowledge in WhatsApp. This was followed by Facebook with a mean score 3.08. Snapchat had the least mean score (1.39), implying that the respondents had the very low knowledge of snapchat. This result is similar to [8] that majority (46.2%) of the respondents used WhatsApp. WhatsApp and Facebook are among commonest social media channels of communication.

Table 3: Extent of knowledge of various social media channels of communication available among the respondents.

S/No	Social media channels of communication	Statistics	
		Mean	Coefficient of variation
1	Facebook	3.08	0.47
2	Twitter	1.82	0.65
3	YouTube	2.23	0.56
4	WhatsApp	3.46	0.42
5	Google~s	1.55	0.63
6	LinkedIn	1.40	0.63
7	Skype	1.40	0.65
8	Instagram	1.89	0.65
9	Snapchat	1.39	0.68
	Overall average	2.02	

Mean score = 3.0
Source: Field Survey, 2023

Willingness to adopt social media as channel of agro-communication

The result in Table 4 presents the positions of the respondents on willingness to adopt agricultural information from social media channels. The result shows that 68.55% of the respondents indicated willingness while 31.45% indicated unwillingness to adopt agricultural information from social media channels. This means that majority of the respondents were

willing to adopt agricultural information from social media channels. The finding is in line with [9] who reported high mean scores for farmers in Ogun State who were willing to adopt agricultural information from the social media because it interaction with the contact farmers clearer and more understandable.

Agricultural information from social media channels appears to be more current, readily available, accessible and transferable (through sharing) than those provided by extension workers. Hence, most of the respondents, who are predominantly young farmers, indicated willingness to adopt agricultural information from these sources.

Table 4: Willingness to Adopt agricultural information from social media channels.

Willingness position	Frequency	Percentage (%)
Unwilling	89	31.45
Willing	194	68.55
Total	283	100

Source: Field Survey, 2023

Effect of socioeconomic characteristics of farmers on their willingness to adopt social media as channel of agro-communication

Binary logistic regression was used to test hypothesis one. The result is presented in Table 5. The result shows that the Chi-square statistic (106.75) was statistically significant (p<0.01). Hence, the null hypothesis was rejected and the alternative hypothesis accepted. The implication is that socioeconomic characteristics of farmers have significant effect on willingness to adopt agricultural information from social media channels. The Pseudo R^2 for the regression model was 0.3029. This implies that the predictors in the model accounted for 30.29% of the variations in the probability of adopting agricultural information from social media channels.

The odd ratio of sex is statistically significant at 5% level, but the z-statistic was negative. This means that the probability of adoption of agricultural information from social media channels was higher among female farmers. Female farmers are, by re-

ligious tenets, restricted from physical contact with extension agents. Hence, obtaining information from the social media channels is more convenient for them. This result contradicts [3,10] who reported that the adoption of social media information was predominant among male farmers in the Federal Capital Territory and Imo State, respectively.

The odd ratio of education was statistically significant at 1% level. Since the statistic (4.41) was positive, the result implies that increase in the educational status of the respondents increased the probability of adoption of agricultural information from the social media. The language of the social media is English Language; therefore, one must be literate to use the social media. In addition, one must be educated to be able to comprehend and adopt agricultural information from social media channels. This result contradicts [10] who reported that education was significant but negative signed.

The odd ratio of membership of cooperative society was statistically significant at 1%. Because the z-statistic was negative, the result implies that non-membership of cooperative society or social groups reduced the probability of adopting agricultural information from social media channels. Cooperative societies or social groups are the targets for extension visit or formal dissemination of agricultural innovations. Hence, members could rely on the information from these agents to the neglect of social media channels. In addition, since farmers are used to face-to-face contact, they may be skeptical about information from faceless sources. The result of this study is at variance with [4] who found that membership of association had no significant effect on adoption among social media users in the Federal Capital Territory.

Finally, the odd ratio of the number of extension agents' visit was statistically significant at 1%. Since the sign of the z-statistic was positive, the result implies that the number of extension agents' visit increased the probability of adopting agricultural information from social media channels. Several visits from the extension agents would enable farmers to compare the effectiveness of their agricultural information with that of social media channels.

Table 5: Effect of socioeconomic characteristics on willingness to adopt

Independent variables	Odds Ratio	Standard Error	z-statistic	P>|z|	[95% Conf. Interval]	
Constant	0.24	0.36	-0.95	0.34	0.01	4.52
Age	1.00	0.04	0.12	0.903	0.93	1.09
Sex	0.45	0.16	-2.21	0.027**	0.22	0.91
Marital Status	1.92	0.88	1.42	0.154	0.78	4.69
Education	6.01	2.44	4.41	0.001***	2.71	13.34
Household size	1.01	0.05	0.32	0.748	0.93	1.11
Farming experience	0.96	0.04	-1.01	0.316	0.88	1.04
Membership of cooperative or social group	0.32	0.12	-2.98	0.003***	0.15	0.67
Number of extension agents visit	4.55	1.48	4.66	0.001***	2.40	8.60

LR chi^2(8) = 106.75***
Prob > chi2 = 0.0000
Log likelihood = -122.83345
Pseudo R^2 = 0.3029
, * statistical significance at 5% and 1%, respectively.

Conclusion and recommendations

The study concluded that that farmers are willing to adopt social media as channels of agro-communication. The willingness is influenced by the farmer's sex, education, membership cooperative society/social group and frequency of extension agents' visit.Based on the findings of the study, it was recommended that the Gombe State Agricultural Development Programme (ADP) [11,12] should educate farmers on the various social media channels so as increase rural farmers knowledge of available social media channels and consequently facilitate their adoption of social media as agro-communication channels; and the National Agricultural Extension Research and Liaison Services should collaborate with the Gombe State ADP to campaign for the adoption of social media as agro-communication channels among farmers in rural communities.

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