SOCIO-ECONOMIC VARIABLES INFLUENCING THE USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES (ICTs) IN AGRICULTURAL EXTENSION SERVICE DELIVERY AMONG FARMERS IN YOBE STATE, NIGERIA

ABSTRACT

The study assessed socio-economic variables influencing the use of information and communication technologies (ICTs) in agricultural extension service delivery among farmers in Yobe state, Nigeria. The specific objectives of the study were to: describe the socio-economic characteristics of the farmers in the study area; examine the use of ICTs among the farmers in the study area; and determine the relationship between selected socio-economic characteristics of the farmers and the use of ICTs in the study area. A multi-stage sampling procedure was employed. Data were obtained primarily from 130 respondents through structured questionnaire. Data collected were analyzed using frequency counts, percentages, mean, and multiple regressions. The results on socio-economic characteristics revealed that majority (67.7%) of the respondents were male, married and within the active age group of 26-40 years (54.6%). Majority (49.2%) had no formal education with a mean household size of 5.35 indicating over dependency on family labor. The respondents (34.6%) had 11-20 years of farming experience but lack ICT proficiency training and were not members of any cooperatives while (57.7%) cultivates between 2-4 hectares in which (47.7%) earns between ₦100, 001-₦300, 000 per annum. Mobile phone, internet and radio were the most frequently used ICT tools by farmers in the study area. The results of multiple regression analysis revealed a high coefficient of multiple determinations (R^2) of 0.711. This indicates that 71.1% of the total variables were caused by changes in the independent variables. Educational level, farming experience, computer literacy, and annual income are statistically significant at $p \leq 0.01$ level of significance. The study concludes that farmers utilize a limited number of ICTs, although these tools are moderately available and accessible. The study recommended that awareness on the use of ICTs such as the internet and computer for agricultural information transfer and retrieval should be encouraged, dissemination of agricultural information through radio and television programs as well as mobile phone would be recommended for greater agricultural production.

KEY WORDS: Socio-economic, ICT, Agriculture, Farmers, Extension, Services

1. INTRODUCTION

In today's age of globalization, Information and Communication Technology (ICT) has emerged as a potent tool for enhancing the delivery of extension services and promoting local development opportunities (Gurstein, 2003). ICT serves as a versatile means of providing the latest agricultural technology to rural farming communities, paving the way for the emergence of knowledge-driven societies in the developing world. This entails utilizing technologies like computers, the internet, phones, television, radio, and other communication devices (Hassan and Shariff, 2007). The ICT in agricultural extension and rural development plays a significant role

in providing a medium through which farmers and rural dwellers could have adequate access to agricultural information (CTA, 2008). The integration of telecommunications, computers, software, storage devices, and audio-visual systems underscores the importance of ICT in agriculture by facilitating the dissemination of current and proven research information, ultimately bolstering production (Lio and Liu, 2006; Mabe and Oladele, 2012).

Moreover, agricultural development in Africa, particularly in Nigeria, has been hindered by limited information exchange among stakeholders in the sector (Agwu and Uchemba, 2004). The dissemination of agricultural information is critical for boosting productivity by enabling farmers to adopt innovations (Sanusi *et al*., 2010). Effective communication skills among extension workers and trainers are essential for conveying relevant information to farmers (Okunade and Oladosu, 2006). Recognizing the need for an Agricultural Knowledge and Information System (AKIS), traditional communication channels such as farm visits and personal letters have proven ineffective (Arokoyo, 2005). ICTs have the potential to reduce barriers posed by distance and enhance information flow, enabling even remote rural farmers to connect with extension workers and access timely information on inputs, technologies, weather forecasts, and more (Adebayo and Adesope, 2007). Omotayo (2005) opined that since agricultural extension depends largely on information exchange, extension workers who are the direct link between farmers and other actors in AKIS are positioned to make use of ICT to access expert knowledge and other types of information that could facilitate the accomplishment of their routine activities.

With the rapid development of ICT in recent decades, there has been a growing interest in harnessing their potential in the agricultural sector to encourage their adoption by farmers (Information and Communication Technology Agency of Sri Lanka, 2010). They also play a crucial role in providing knowledge, new technologies, up-to-date information, and services to enhance production, market access, capacity building, empowerment, and the implementation of newly developed agricultural practices and methods derived from extension education (Chadwick, 2003). Promoting access to information to improve the socio-economic conditions of farmers has consistently been a top priority for agricultural extension personnel and rural advisory service providers. Information exchange is vital for stakeholders in the agricultural value chain to reduce information and communication disparities and break the cycle of poverty (FAO, 2011). It is evident that traditional extension methods or village extension agents alone cannot efficiently or cost-effectively serve a densely populated developing country like Nigeria, where the majority of the population is engaged in agriculture. Consequently, there is a need for adequate support for extension services through the integration of ICTs. The effectiveness of extension agents in fulfilling their vital role of communicating with farmers is hindered by various factors, especially the extremely low ratio of extension agents to farmers in the study area. Yobe State, for instance, has a ratio of 1 extension agent for every 2,472 farmers, far below the recommended ratio of 1:800 by the World Bank (Haruna and Abdullahi, 2013). This substantial disparity in the extension agent-farmer ratio means that many small-scale farmers in rural areas do not have access to extension services. To address these gaps, extension agents should leverage ICTs for efficient dissemination of agricultural information to farmers. These call for the need to assess socioeconomic variables influencing the use of information and communication technologies (ICTs) in agricultural extension service delivery among farmers in Yobe State, Nigeria. The specific objectives of the study were to:

i. describe the socio-economic characteristics of the farmers in the study area;
ii. examine the use of ICTs among the farmers in the study area;

iii. determine the relationship between selected socio-economic characteristics of the farmers and the use of ICTs in the study area.

2. METHODOLOGY

2.1 The Study Area

The study was conducted in Yobe State, Nigeria. The state is located in the Northeastern part of Nigeria and lies between latitudes 120^0 00" N and longitudes 110^0 30" E of the equator (Google map, 2018). The state shares an international border to the north with Diffa and Zinder Region in the Republic of Niger and state boundaries with Bauchi to the west, Borno to the east, Gombe to the southwest and Jigawa state to the northwest (Fig. 1). The State has a total land area of 45,502 km2 with a population of 2,321,339 and 2022 projected population estimate of 3,965,457 based on 3.2% population growth rate (NPC, 2006). The climate of the area is dry savannah belt with hot and dry seasons for most of the year, except in the southern part of the state which has a mild climate. The annual temperature of the state ranges from 390C - 420C. The area experiences 500mm - 1000mm of annual rainfall. The period of rainy season in the state varies from place to place, but generally lasts for about 120 days (i.e. June to September) in the north and more than 140 days (May to October) in the south.

2.2 Validity and Reliability Test

The information collected at the field was completely reliable. The approach of the study offers an excellent way to gather and generate firsthand information from ground reality. The questionnaires were validated by experts in the field of agricultural extension. Split half method was used to test the reliability of the research instruments for data collection. The coefficient of determination of (r) obtained was 0.65. This indicates that 65% of the questionnaires administered to the respondents were valid for the study.

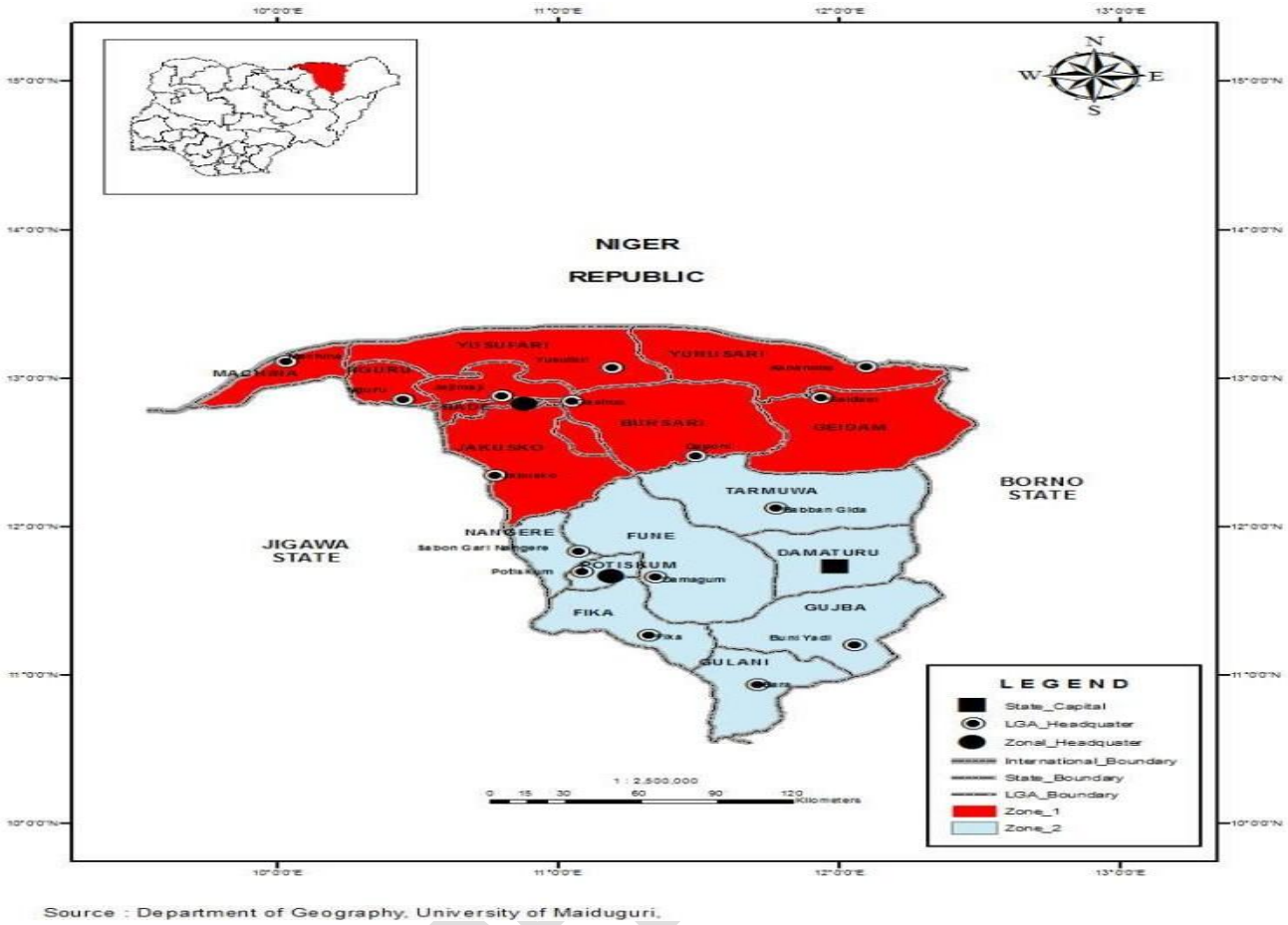

Fig. 1: Map of Yobe State Showing the Selected Agricultural Zone

2.3 Sampling Procedure and Sample Size

A multi stage sampling procedure was employed in selecting the respondents used for the study. In the first stage, the study considered the two (2) Agricultural Zones; Bade (zone l) and Potiskum (zone ll), since; they are the only zonal headquarters of Agricultural Development Program (ADP) in the state. In the second stage, a proportionate selection of thirteen (13) agricultural blocks out of the thirty three (33) agricultural blocks in the zones were done using Taro Yamane's formula. In the third stage, the 13 agricultural blocks obtained from zone (l) and (ll) were selected randomly from the sampling frame of all blocks in zone I and II. In the fourth stage, out of eight (8) cells under each of the selected blocks in the zones, two (2) cells were selected at random from the 13 sampled blocks to give a total of 26 cells. In the fifth stage, five (5) contact farmers out of twenty five (25) were selected from each of the selected 26 cells using simple random sampling to give a total of 130 farmers that were used for the study. The proportionate selection of the agricultural blocks was done using Taro Yamane's formula (1967) as expressed below:

$$n = \frac{N}{1 + N(e)^2} \quad \text{.....(i)}$$

Where,

n =Number of respondents

N = Population size

e = Error term (0.30)

Number of sampled agricultural blocks in Zone I using Taro Yamane's formula for proportionate sampling is expressed thus;

$$n = \frac{15}{1 + 15(0.3)^2}$$

$$n = \frac{15}{1 + 1.35}$$

$$n = \frac{15}{2.35}$$

$$n = 6.4$$

Number of sampled agricultural blocks in Zone II using Taro Yamane's formula for proportionate sampling is expressed thus;

$$n = \frac{18}{1 + 18(0.3)^2}$$

$$n = \frac{18}{1 + 18(0.09)}$$

$$n = \frac{18}{1 + 1.62}$$

$$n = \frac{18}{2.62}$$

$$n = 7$$

Table 1: Summary of Sampling Procedures and Sample Size

Zones	Zonal Headquarters	No. of Agric. Blocks	No. of Agric. Blocks Sampled and their Names		No. of Cells Sampled and their Names		No. of Sampled Farmers
1	Bade	15	6	Amshi	2	Dachi'a	5
						Bizi	5
				Baimari	2	Kankare	5
						Garin dole	5
				Yunusari	2	Toshi'a	5
						Dilala	5
				Geidam	2	Kalgeri	5
						Kelluri	5
				Gashu'a	2	Usur	5
						Dawayo	5
				Yusufari	2	Kachallari	5
						Takashi'a	5
2	Potiskum	18	7	Mamudo	2	Maje	5
						Adaya	5
				Babban gida	2	Koromari	5
						Jumbam	5
				Bumsa	2	Bara	5
						Kukuwa	5
				Damaturu	2	Maisandar	5
						Malamatar	5
				Buni yadi	2	Buni gari	5
						Kotorko	5
				Kukar gadu	2	Daya	5
						Garinbuba	5
				Jajere	2	Mashio	5
						Kollere	5
	Total:	33	13		26		130

2.4 Measurement of Variables

Dependent Variable

It is a variable that is the outcome or result or impact of different factors. This variable is frequently known as a criterion variable. The estimation of the dependent variable relies upon the estimation of alternate factor, that is, autonomous factors. In this study, use of ICTs was considered as the dependent variable. The dependent variable (Y) is the use of ICTs. The study referred to the following ICTs used in extension services: radio, television, computer, mobile phone, DVD/VCD, projector, print materials, internet, viewing centers and social media.

Independent Variable

The independent variables were chosen because they are the key variables of the farmers that influence productivity and production. It has been used by several authors such as Mustapha *et al*. (2012) and Nwaiwu (2015).

i. *Age:* this refers to the number of years' an individual attained from birth till date and believed to be capable of influencing the perception, view, interest and conduct of a person. This was measured in years.

ii. *Sex:* this means the male or female category of respondents. This was given a dummy variable of 0 or 1, such that males were scored 1 and female were scored 0.

iii. *Farming Experience:* this is the number of years a farmer has been engaging in farming. Farming experience was measured in years.

iv. *Household Size:* this refers to the number of individuals in the household, which include wives, children, and dependents who reside within the same family unit and eat from the same pot. This was measured in numbers.

v. *Educational Background:* this refers to the ability of an individual to read and write, which is acquired in a formal or informal organized means or through schooling. This was measured on the scale scored from 0-4. Thus farmers were scored 1 with no formal education, while those with primary and secondary education were scored 2 and 3 respectively. Finally, those with tertiary education were scored 4.

vi. *Annual Farm Income:* this refers to proceeds, returns or earnings of respondents. This includes income earned in farming. This was measured by knowing the number of bags (or standard unit of measurement) of crop (or farm produce) harvested by the farmer in the season under consideration and then converted to naira (₦) equivalent.

vii. *ICT Literacy:* this refers to the ability of an individual to operate or utilize the ICT tools effectively like computer, internet, projector, print materials, mobile phone etc. this was categorized and measured as no training=1, self training=2, trained by association and trained by extension agent=4.

viii. *Farm Size:* this is the total land area under cultivation by the farmer. This was measured in hectares (ha).

2.5 Data Analysis

Data generated were analyzed using both descriptive and inferential statistics. Descriptive statistics such as frequency count, percentages and mean were used to analyze objectives (i) and (ii). Inferential statistics e.g. multiple regression models were used to determine the relationship between selected socio-economic characteristics of the farmers and the use of ICTs in the study area (i.e. objective iii). The regression model is expressed as:

$$Yi = a + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_5 + \beta_6 x_6 + \beta_7 x_7 + \mu \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(iii)}$$

Where,
Yi = ICT use (Number of ICT),
X_1= Age of respondents (Years),
X_2= Sex (Dummy),
X_3 = Educational background (Formal education),
X_4 = Household size (Numbers),
X_5= Farming experience (Years),
X_6 = ICT literacy (Yes = 1, No = 0),
X_7 = Annual farm income (Naira),
a = Constant,
μ = Error term
β_1 - β_7 = Parameter estimates
X_1 - X_7 = Independent variables

3.0 RESULTS AND DISCUSSION

3.1 Socio-economic Characteristics of the Respondents

The results on socioeconomic characteristics of the respondents revealed that majority of the respondents are within the active age group of 26-40 years (54.6%). This implies that the farmers are within their productive age and responsible for the upkeep of their families and likely to use ICTs for agricultural information transfer. This is in line with the findings of Muhammad *et al*. (2019), which showed that slightly more than half (52.7%) of the respondents belonged to young age group having age up to 30 years. The results on sex revealed that majority (67.7%) of the respondents were male. Despite the dominance, 32.3% of the respondents were female showing an improvement to women involvement in agricultural activities and information utilization. This agrees with the findings of Ariyo *et al*. (2013) that men are more involved into farming than women.

Majority of the respondents (63.1%) are married. This result implies that married people were mostly involved in agricultural production because of their urge to satisfy their family demand. This finding is in agreement with Obinna and Nzeakor (2014) which indicate that, 80% of the farmers were married. This is an indication that the respondents need ICT because of appropriate information retrieved from different ICTs tools in order to meet up with the family responsibilities. Table 2 showed that most (49.2%) of respondents had no formal education. This indicates that most of the respondents had low level of literacy and thus unable to acquire and understand ICT as an information dissemination tool and its importance in information retrieval in the improvement of agriculture. This finding is in tandem with Iorliam *et al*. (2012) who showed that majority of the farmers had low literacy levels with 33% and 36% respectively. This

may account for the low percentage adoption of other ICTs in the study area. The implication of this study showed that farmers in the study area had limited educational background which will deprive them from using ICTs in accessing relevant agricultural information.

Moreover, results indicate that (34.6%) of the respondents have been engaged in farming for 11-20 years. The mean value of years of farming experience was 11.18 years which showed that the respondents were experienced in farming activities. The result agrees with Olaninyi (2013) who indicate that the sampled poultry farmers had acquired a wide range of farming experience as majority (50.6%) had between 6 and 10 years of poultry farming experience. Their experience may likely have negative implication because some experienced farmers are likely to be very conservative and less amenable to new trend of ICTs including adoption of modernization in agricultural extension services. Majority of the respondents (57.7%) cultivate between 2-4 hectares of farm land as shown in Table 2. The mean value of farm size of the respondents is 2.16. This finding supported the view of Ayanda (2019) which indicates that most (79.8%) of the small scale rice farmers (SSRFs) operated 1-2 hectares with an average farm size of 2.6 hectares. This implies that average farm size is a key factor in the adoption of any given innovation and will predispose farmers to acquire more agricultural information and knowledge through ICT facilities in the course of extension services.

Furthermore, (72.3%) of the respondents were not members of any cooperative. The result agrees with the findings of Agwu *et al*. (2008) who indicate that 79.2% of the farmers did not belong to any farm association. This implies that membership of association enable farmers to access numerous agricultural programs including knowledge on how to access and utilize ICTs while non-involvement will result to low level of innovativeness due to lack of group dynamic effects and chances to make decision to utilize ICTs in accessing agricultural information. The result on ICT proficiency showed that a large proportion (72.3%) of the respondents had no proficiency training in ICT gadgets. This implies that majority of the respondents did not acquire any form of training on how to use ICT gadget in retrieving and sharing agricultural knowledge and information that will result into bumper harvest and increased income. This finding is in line with that of Tarus *et al*. (2015) which indicate that majority of the interviewed farmers (61.8%) were not computer literate. By implication, ICT literacy is a strong determinant in accessing up to date agricultural information through extension contact but whenever farmers lack basic ICT training; chances are that they might easily not obtained the current trend in agricultural production.

Greater proportions (47.7%) of the respondents earned between ₦100, 001-₦300, 000 per annum. The mean annual income of the respondents was ₦176, 923.87. The variation in the annual income may be due to difference in the number of farm input used, system of farming, family labor and farm size. This is because most of the respondents were small scale farmers. The implication of this finding to the study is that greater proportions of the respondents' were not financially buoyant to purchase and maintain most of the vital ICT gadgets which should be used in obtaining relevant agricultural information. This led to lower level of ICTs utilization in the study area as well as in most African communities. This finding agrees with Nwalieji *et al*. (2019) who indicate that majority (70.8%) of the farmers earned between ₦100, 000-₦200, 000 per year and the mean income was ₦268, 450.

Table 2: Distribution of the Respondents According to their Socio-economic Characteristics

Variables	Frequency (f)	Percentages (%)	Mean ($\bar{x}$)
Age (Years)			
≤ 25	14	10.8	
26-40	71	54.6	
41-55	30	23.1	33.5
≥ 55	15	11.5	
Sex			
Male	88	67.7	
Female	42	32.3	
Marital Status			
Married	82	63.1	
Single	20	15.4	
Divorced	11	8.5	
Widow	15	11.5	
Separated	2	1.5	
Educational Background			
No Formal Education	64	49.2	
Primary Education	17	13.1	
Secondary Education	27	20.8	
Tertiary Education	22	16.9	
Household Size (Number)			
1-5	51	39.2	
6-10	53	40.8	5
11-15	18	13.8	
≥ 16	8	6.2	
Farming Experience (Years)			
≤ 5	16	12.3	
6-10	38	29.2	
11-20	45	34.6	2
≥ 21	31	23.8	
Farm Size (ha)			
≤ 1	36	27.8	
2-4	75	57.7	2
≥ 5	19	14.6	
Membership of Association			
Yes	36	27.7	
No	94	72.3	
ICT Proficiency Training			
No Training	94	72.3	
Self Trained	21	16.2	
Trained by Association	7	5.4	
Trained by Extension Agent/Worker	8	6.2	
Annual Farm Income (₦)			
≤ 100,000	27	20.8	
100,001 - 300,000	62	47.7	176,924
300,001 - 500,000	32	24.6	
≥ 500,001	9	6.9	
Total	**130**	**100**	

Source: Field Survey, 2024

3.2 Use of ICTs among the Respondents

The outcomes of the analysis presented in Table 3 provide a breakdown of the percentage distribution of different ICT usage patterns among the respondents. The results indicated that mobile phones and internet were utilized by 83.8% of the respondents. Radio usage was reported by 81.5% of the respondents. These findings highlight that mobile phones, internet, and radio were the most frequently employed ICT tools for agricultural extension services among the study's participants. This suggests that respondents predominantly relied on mobile phones, internet, and radios for their ICT needs, possibly due to the various advantages associated with these ICT facilities in sourcing agricultural information such as market price information, weather information, pest and disease control strategies, source of inputs, access to credits/loans, extension services and programs, good agronomic practices (GAP) etc.

This finding aligns with those of Akinnagbe and Oladipupo (2018), who reported that arable crop farmers primarily used the following ICTs: radio (81.7%), mobile phones (79.2%), and television (73.3%). According to their research, radio, mobile phones, and television were the accessible and commonly used ICTs among farmers. This also implies that digital ICT facilities, such as the internet and computers, were utilized to a much lesser extent by farmers. This limitation could result in farmers missing out on valuable information available on the internet, which serves as a substantial source of recent developments in agricultural extension services (Agwu and Chah, 2007). Consequently, this highlights the importance for concerned stakeholders in the agricultural development process to advocate for the integration of ICT access, availability, and utilization mandates into national and state extension system policies. This would ensure that verified agricultural information is readily accessible to farmers for their use.

Table 3: Distribution of the Respondents According to Use of ICTs

Variables	Frequency (f)	Percentages (%)
Computer		
Yes	18	13.8
No	112	86.3
Radio		
Yes	106	81.5
No	24	18.5
Television		
Yes	69	53.1
No	61	46.9
Mobile Phone		
Yes	109	83.8
No	21	16.2
Print Materials		
Yes	48	36.9
No	82	63.1
Social Media		
Yes	80	61.5
No	50	38.5
Viewing Center		
Yes	16	12.3
No	114	87.7
DVD/VCD		
Yes	42	32.3
No	88	67.7
Internet		
Yes	109	83.8
No	21	16.2
Projector		
Yes	5	3.8
No	125	96.2
Total:	**130**	**100**

Source: Field Survey, 2024

3.3 Relationship between Selected Socio-economic Characteristics of the Farmers and the Use of ICTs

Multiple regression analysis was employed to establish the connection between specific socio economic attributes of the respondents and their utilization of ICTs within the study area.

Various functional forms, including linear, double log, semi-logarithmic, and quadratic equations, were tested to explore the relationship between these variables. Ultimately, the linear form was selected as it exhibited the most favorable functional characteristics based on both statistical and econometric considerations, as evident in the model. The model demonstrates a strong degree of fit, as exemplified by the R^2 value. The results of the multiple regression analysis, presented in Table 4, revealed a notably high coefficient of multiple determination (R^2) amounting to 0.711. This implies that approximately 71.1% of the variance observed in the

dependent variable could be accounted for by alterations in the independent variables encompassed within the regression model. This statistic also provides insight into the intensity and direction of the association between the two variables encompassed in the model, as depicted in the table. The low standard error of the estimates (0.16735) and the substantial significance values associated with the independent variables underscore the statistical reliability and credibility of both the regression model and the obtained results.

Table 4: Relationship between Selected Socio-economic Variables and the Use of ICTs

Variables	Coefficient	Std. Error	t-value	Significance
(Constant)	1.932	0.099	19.580	0.001
Age (X_1)	-0.083	0.038	-2.192	0.121NS
Sex (X_2)	0.621	0.453	1.371	0.289NS
Educational level (X_3)	0.224	0.016	13.796	0.000*
Household size (X_4)	0.225	0.203	1.111	0.264NS
Farming experiences (X_5)	0.157	0.022	7.212	0.000*
ICT literacy (X_6)	0.172	0.019	9.049	0.000*
Income level (X_7)	0.212	0.018	11.771	0.001*
$R^2 = 0.711$ Adjusted $R^2 = 0.689$ SEE = 0.16735				

Source: Computed from Field Data, 2024
* Significant at 0.01 ($p \leq 0.01$) level of significance
NS = Not statistically significant.

The model summary table in Appendixes revealed that the variation in farmers' use of ICTs was explained by predictor variables. The F-value of 26.628 serves as an index for decision-making in the analysis. The low F-statistics value indicates a significant influence of the independent variables on the dependent variable. This is demonstrated by the 1,122 degrees of freedom of the F-value at 0.000 ($p \leq 0.01$), highlighting the direction and strength of the independent variables' impact on the dependent variable. Out of the seven independent variables, four were found to be significant determinants of ICT tool utilization among farmers. These significant determinants were educational background ($t = 13.796$, $p \leq 0.01$), farming experience ($t = 7.212$, $p \leq 0.01$), computer literacy ($t = 9.049$, $p \leq 0.01$), and income level ($t = 11.771$, $p \leq 0.01$). This suggests that increases in these socio-economic characteristics are likely to lead to higher levels of ICT utilization, and vice versa.

The results are consistent with the findings of Williams and Agbo (2013), which also show a high coefficient of multiple determinations (R^2) of 76.6%. The influence of the independent variables on the dependent variable was indicated by the value of F-statistics (45.441). The absence of autocorrelation was confirmed by the low Durbin-Watson value of 2.206. Additionally, the findings revealed a low value of SSE (0.3851). Among the independent variables, educational level (X_1) was positively signed but not statistically significant, suggesting that a higher level of education led to increased access to ICT facilities in the study area. Age (X_2) showed a negative relationship and was significantly related to the dependent variable, indicating that older farmers were less likely to use ICTs due to technical difficulties. Annual farm income (X_4) was positively signed and highly significant at the 0.01 level, implying that higher annual income corresponded to greater ICT usage. Respondents' farm size (X_5) was positively related and significantly correlated with the dependent variable at $p \leq 0.01$, indicating that larger farm sizes were associated with higher ICT facility utilization. ICT literacy (X_6) exhibited a positive coefficient and was highly significant at the 0.01 level, suggesting that farmers with training in ICT gadgets had better access to and utilization of ICTs. Annual income (X_7) displayed a positive coefficient and was highly significant, signifying that higher annual farm income was linked to increased ICT tool adoption. Overall, these findings underscore the importance of factors such as education, age, income, computer literacy, and farm size in influencing farmers' access to and use of ICTs as sources of agricultural information. In a relevant study by Okoedo-Okojie and Omoregbee (2012), the model Chi-Square (49.09), which is significant at 1% (Critical R^2 =0.8646) is an indication of the strong influence of the significant explanatory variables on respondents likelihood of high access to utilize new ICTs in the study area.

4. CONCLUSION

The study concludes that farmers in the area utilize a limited number of ICT tools, although these tools are moderately available and accessible. These ICTs hold significant potential for enhancing agricultural extension services in the state and the country as a whole. Farmers acknowledge the value of ICTs as valuable sources of agricultural information but face certain obstacles that hinder their full utilization, including issues related to availability, accessibility, and other constraining factors. To promote the broader adoption of ICTs in agricultural activities, it is crucial to address these challenges and create a supportive environment that encourages farmers to embrace ICTs more extensively towards an effective extension services and better agricultural production as indicated by some of the independent variables such as annual farm income, computer literacy, educational level, and farming experience as a strong determinant of the likelihood of higher level of ICT utilization.

5. RECOMMENDATION

Based on the research findings, the study puts forward the following recommendations:

1. There is a need for heightened awareness and education regarding the effective utilization of ICT tools like the internet, projector, and computers among farmers. This will empower them to efficiently access and retrieve agricultural information such as improved varieties, certified seed, access to credits, input supply, climate mitigation, market information etc.
2. Dissemination of agriculture-related information through radio and television programmes as well as mobile phone would be recommended.

3. Enhancing ICT infrastructure is crucial, and initiatives such as skill acquisition and vocational training on ICT usage should be readily accessible to farmers at easily reachable locations. This will enable them to fully harness the potential of information and communication technologies.
4. Encouraging farmers to form or joint cooperatives that will enable them have access to many agricultural information and intervention through ICTs e.g. social media platforms; instead of relying on government to provide information and services towards sustainable agricultural food system.

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APPENDIXES: RESULT OF ANALYSIS

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REGRESSION
  /DESCRIPTIVES MEAN STD.DEV CORR SIG N
  /MISSING LISTWISE
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/STATISTICS COEFF OUTS CI R ANOVA
/CRITERIA=PIN(.05) POUT(.10)
/NOORIGIN
/DEPENDENT LU1

/METHOD=ENTER S1Q1 S1Q2 S1Q4 S1Q5 S1Q6 S1Q9 S1Q10.
```

Regression

Descriptive Statistics

	Mean	Std. Deviation	N
LU1	1.6046	.25876	130
Age of the Respondent	2.91	1.137	130
Sex of the Respondent	1.32	.469	130
Educational Background of the Respondent	2.05	1.177	130
Household Size of the Respondent	2.39	1.297	130
Farming Experience of the Respondent	2.70	.970	130
ICT Proficiency Training of the Respondent	1.45	.855	130
Annual Farm Income of the Respondent	2.40	1.111	130

Correlations

		LU1	Age of the Respondent	Gender of the Respondent	Educational Background of the Respondent	Household Size of the Respondent	Farming Experience of the Respondent	ICT Proficiency Training of the Respondent	Annual Farm Income of the Respondent
Pearson Correlation	LU1	1.000	.362	.205	-.709	-.059	.355	-.346	-.085
	Age of the Respondent	.362	1.000	-.045	-.332	-.028	.839	.123	.490
	Gender of the Respondent	.205	-.045	1.000	-.158	-.159	-.075	-.136	-.309
	Educational Background of the Respondent	-.709	-.332	-.158	1.000	.144	-.312	.207	.037
	Household Size of the Respondent	-.059	-.028	-.159	.144	1.000	-.035	.146	.089
	Farming Experience of the Respondent	.355	.839	-.075	-.312	-.035	1.000	.044	.472
	ICT Proficiency Training of the Respondent	-.346	.123	-.136	.207	.146	.044	1.000	.232
	Annual Farm Income of the Respondent	-.085	.490	-.309	.037	.089	.472	.232	1.000

Sig. (1-tailed)	LU1	.	.000	.010	.000	.254	.000	.000	.169
	Age of the Respondent	.000	.	.304	.000	.377	.000	.081	.000
	Sex of the Respondent	.010	.304	.	.036	.036	.198	.061	.000
	Educational Background of the Respondent	.000	.000	.036	.	.052	.000	.009	.339
	Household Size of the Respondent	.254	.377	.036	.052	.	.346	.049	.156
	Farming Experience of the Respondent	.000	.000	.198	.000	.346	.	.310	.000
	ICT Proficiency Training of the Respondent	.000	.081	.061	.009	.049	.310	.	.004
	Annual Farm Income of the Respondent	.169	.000	.000	.339	.156	.000	.004	.
N	LU1	130	130	130	130	130	130	130	130
	Age of the Respondent	130	130	130	130	130	130	130	130
	Sex of the Respondent	130	130	130	130	130	130	130	130
	Educational Background of the Respondent	130	130	130	130	130	130	130	130

	Household Size of the Respondent	130	130	130	130	130	130	130	130
	Farming Experience of the Respondent	130	130	130	130	130	130	130	130
	ICT Proficiency Training of the Respondent	130	130	130	130	130	130	130	130
	Annual Farm Income of the Respondent	130	130	130	130	130	130	130	130

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Annual Farm Income of the Respondent, Educational Background of the Respondent, Household Size of the Respondent, ICT Proficiency Training of the Respondent, Sex of the Respondent, Farming Experience of the Respondent, Age of the Respondent	.	Enter

a. All requested variables entered.

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Annual Farm Income of the Respondent, Educational Background of the Respondent, Household Size of the Respondent, ICT Proficiency Training of the Respondent, Sex of the Respondent, Farming Experience of the Respondent, Age of the Respondent	.	Enter

b. Dependent Variable: LU1

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.777[a]	.711	.689	.16735

a. Predictors: (Constant), Annual Farm Income of the Respondent, Educational Background of the Respondent, Household Size of the Respondent, ICT Proficiency Training of the Respondent, Sex of the Respondent, Farming Experience of the Respondent, Age of the Respondent

ANOVA[b]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	5.220	7	.746	26.628	.000[a]
	Residual	3.577	122	.028		
	Total	12.367	129			

a. Predictors: (Constant), Annual Farm Income of the Respondent, Educational Background of the Respondent, Household Size of the Respondent, ICT Proficiency Training of the Respondent, Sex of the Respondent, Farming Experience of the Respondent, Age of the Respondent

b. Dependent Variable: LU1

Coefficients[a]

Model		Unstandardized Coefficients		T	Sig.	95% Confidence Interval for B	
		B	Std. Error			Lower Bound	Upper Bound
1	(Constant)	1.932	.099	19.580	.001	1.565	1.917
	Age of the Respondent	-.083	.038	-2.192	.121	.006	.093
	Sex of the Respondent	.621	.453	1.371	.289	.027	.107
	Educational Background of the Respondent	.224	.016	13.796	.000	.152	.095
	Household Size of the Respondent	.225	.203	1.111	.264	.006	.041
	Farming Experience of the Respondent	.157	.022	7.212	.000	.029	.084
	ICT Proficiency Training of the Respondent	.172	.019	9.049	.000	.106	.033
	Annual Farm Income of the Respondent	.212	.018	11.771	.001	.065	.001