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Factors Influencing the use of Information and Communication Technologies (ICTs) on the Livelihood of Maize Farmers in Taraba State, Nigeria

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ABSTRACT
This study investigated factors affecting the use of information and communication technologies (ICTs) on the livelihood of maize farmers in Taraba State, Nigeria. Utilizing a multistage sampling method and Slovin's formula, data were collected through primary sources and analyzed with descriptive and inferential statistics. Key findings revealed that most maize farmers were male (85%), female (15%). Majority were between 40-49 years old (67%), who were in their productive years. 84% were married and have larger household sizes, with 61% having six or more children. Educationally, 59% have tertiary education, 15% have primary education. Regarding farming experience, 43% had 16 years, and 78% cultivate 5 hectares of land. Institutionally, 52% of farmers were not members of cooperative societies, and 86% lack access to extension services. In terms of ICT access, 75% have access to ICTs, though only 14% have extension contact. On credit access, 84% of farmers find it inadequate. Income levels vary, with 52% earning over N1,000,000 annually. Awareness was determined using a confrontational index with benchmarks 1.50 means score, percentage and ranked. The result showed that farmers were aware of all the ICT components and uses them. The study concluded that socio-economic and institutional factors significantly influence ICT use among maize farmers. It was recommended that sex, household size, level of education, farming experience, farm size, cooperative membership, extension visit, access to ICTs, access to credit for ICTs were found to influence the use of ICTs by maize farmers and should be strengthened.

Keywords: Factors, awareness, ICT, Maize, Farmers

INTRODUCTION

Information technology could be regarded as the coming together of computing and telecommunications to handle information. The bottom line is that information technology is an application that is computer-based to share ideas, data, and other relevant information development. Omotayo (2015) observe that agricultural extension depends largely on information exchange between and among farmers and a broad range of other actors. Agricultural information plays a vital role in empowering farmers to improve their livelihoods by providing important agricultural information such as sowing, improving soils, seeking the best price for their produce and obtaining information on ways to combat pests and diseases.

Even though the contribution of agriculture to Nigeria's GDP continues to decline, about half of the populations are still employed in the sector (Food and Agriculture Organization (FAO, 2015). Maize is one of the staple foods for some one billion people in 105 countries of the world over, where a third of the caloric needs of the people are met (OECD-FAO, 2015).

Early in the 19th century, farmers used to obtain their information from middlemen, extension officers, market boards, farmers' groups, and family/relatives (Alfieri *et al*., 2015). By the end of the 19th century television, radio, mobile phone and other medium of communication had emerged. Radio and television so far are the main electronic broadcast technologies, that provide information to the farmers and most of their communication is one-way communication manner, while mobile phone provides information in two ways communication. The use of mobile phones, radio, and television, increases communication among farmers, markets, and traders without involving middlemen and extension officers but this is not as much as is possible through information communication technologies.

MATERIALS AND METHODS

Methodology

The study centered on maize farmers in Taraba State. A multistage Sampling procedure was employed in selecting respondents from a population of 339 registered maize farmers as obtained by the Taraba Agricultural Development Program (TADP, 2019) in the study area. The first stage involved the random selection of one Local Government Area in each of the three senatorial zones of the State. These Local Government Areas are Ardo-Kola Local Government area from the northern zone, Gassol Local Government Area from the central zone, and Wukari Local Government area from the southern zone. The second stage involved a purposive selection of two communities from each of the selected Local Government Areas based on being the most production in Taraba State.

The sample frame collected from Taraba Agricultural Development Programme (TADP) is 62 maize farmers from Sunkani and 52 from Iware in Ardo-Kola Local Government area, 58 maize farmers from Kwararafa and 62 from Tella in Gassol Local Government area and 54 maize farmers from Kente and 50 from Byepyi in Wukari Local Government area the sample frame is therefore 339. The third stage involved

determining the sample size using Slovins Formular of Yamanen and Taro (1967) in Ariola (2006); Ryan (2013):

$$n_o = \frac{N}{1 + N(e^2)}$$

Where;
n= Sample size
N= Total number of observations
1= Statistical constant
e= Level of significance which is set at 0.05
Hence,

$$n_o = \frac{339}{1 + 339(0.05^2)}$$

$n_o = 183$

One hundred and eighty-three (183) registered maize farmers were used as the sample size for the study. The last stage was to determine the sample size of each community selected, the formular for arriving at the proportional size of the communities selected is:
× 100
Awareness confrontational index (ACI) as contained in work of Kaduna *et al*. (2024):
ACI = [A_A × 2] + [NA ×1]
Where: ACI = Awareness confrontational index
A_A = Aware
A_{NA} = Not Aware
Multiple regression model was used to analyse factors influencing the level of use of ICTs. The model is specified as follows: Y = $X_1 + X_2 + X_3 + X_4 + X_5 + X_6 + X_7 + X_8 + X_9 + U$.
Where:
Y= Level ICTs usage by maize farmers.
X_1 = Age
X_2 = Marital status
X_3 = Sex
X_4 = Educational level
X_5 = Farm size
X_6 = Farming experience
X_7 = Household size
X_8 = Access to/ available ICTs
X_9 = Extension contact
X_{10} = Access to credit
X_{11} = Membership of cooperative society
X_{12} = Compatibility
X_{13}= Complexity
X_{14}= Affordability
B_0= Constant
$\beta_1 – \beta_{14}$= Regression coefficients
U = Error term.

Awareness of ICTs among Maize Farmers

The finding in Table 1 revealed that maize farmers in the study area were aware of radio, mobile phone, television and social media with mean scores of 1.99 and 1.98, 1.97, 1.92, 1.93 respectively. The result further showed that farmers were also aware of internet, magazines and newspapers, bulletins, extension guides, and pamphlets with means score 1.88, 1.89, 1.93, 1.91 respectively. This implies that the level of awareness of the farmers in the study area may be due to the availability of the ICTs, purpose, ease of operation, the timing of the activities, presence of institutions and purposes of application packages to agriculture. This agreed with Agwu *et al.* (2018), found that the lack of confidence in operating ICTs among farmers also hindered the farmers in using ICTs. However, the low awareness of opportunities and benefits of using ICTs for agriculture and rural development purposes among the farmers is also another problem faced by the farmers in using ICTs. This is due to little or lack of access and technical knowhow about information among rural farmers in Nigeria (Garandi *et al.,* 2026).

Table 1: Distribution of Farmers based on ICTs Awareness (n= 179)

ICTs	A	NA	CI	
Radio	356	1	357	1.99
Mobile phone	352	3	355	1.98
Television	350	4	354	1.97
Social media	330	14	344	1.92
Internet	334	12	346	1.93
Magazine and News paper	318	20	338	1.88
Pamphlets	320	19	339	1.89
Bulletins	332	13	345	1.93
Extension guide	326	16	342	1.91

ICTS = Information Communication Technologies, A = Aware, U = Undecided, NA = Not Aware, CI = Confrontational index with benchmark 1.50 above as positive, = Mean

Factors Influencing the use of ICTs by Maize Farmers

The result presented in Table 2 showed that coefficient values of sex, farm size, and affordability were significant at a 1% level of probability while education, household size, cooperative society, and compatibility were significant at a 5% level of probability. At a 10% level of probability, farming experience, access to ICTs and access to credit were significant. Generally, the R^2 value of 0.553 implied that the aforementioned factors contributed 55% to ICT usage by farmers, indicating that all the significant factors contributed to ICT usage. Similarly, Raktim *et al*. (2019) also reported that sex, education, and farm size contributed immensely to the use of ICTs by farmers.

Sex of the maize farmers showed a positive influence with a coefficient of 1.186 at a 1% significant level of probability. This implies that the sex of farmers had influence on the use of ICTs in the study area. This is in consonant with Adejoh *et al*. (2016), who reported that more males were highly involved in media access and usage. This also further agreed with the report that male farmers participated more in agriculture and therefore engaged in media usage for sourcing agricultural information (Mani *et al.,* 2022). The result shows that the majority of the respondents were male while few were female. This indicates that men are more involved in farming activities in the study area than women.

Household size influences ICT usage positively with a coefficient of 1.215 at a 5% level of probability. This implies that the more the household size, the more usage of ICTs to source information. This result is supported by Yekini *et al.* (2019), that respondents have large family sizes and are small

income earners. The fact that they are small income earners should not stop them from deriving benefits from the use of ICTs. This is because the most available ICTs to this set of people are relatively affordable, for example radio, television, and mobile phones. They could be used for a longer period if not stolen, and hence they could derive benefits by using them daily. An ICT like a mobile phone often comes with a radio, hence they might not need to buy a separate radio set.

Education of the maize farmers indicated a positive coefficient (3.944) and was significant at 5% level of probability. This implies that the higher the educational level, the more likely the usage of ICTs by maize farmers. The result corroborates with the finding of Gichangi *et al*. (2019), they discovered that the coefficient for education level has the expected positive sign and is statistically significant in influencing smallholder's farmers' and Bekele and Guadie (2020), who reported that education level influences the use of production input at 10% level of probability in the study area.

The result of the study indicated that farming experience was significant at a 10% level of probability with a positive coefficient (6.987) meaning that the more the experience of the farmers, the more likely the use of ICTs. However, this agrees with Tanko (2019) who averred that the years spent in farming by rice farmers reduces inefficiency in the use of resources and boosts production.

The farm size of the maize farmers in the study area positively influenced the level of ICT usage with a coefficient of 1.542 and was significant at a 1% level of probability. This implies that the larger the farm sizes the more likely the ICT usage. Farmers with larger farm sizes were willing to adopt new and improved practices such as mass media usage. This agreed with Ibitola *et al*. (2019), who reported that farm size is significant and positively influences the use of production input for labor at a 1% level of probability.

Cooperative society membership had a positive coefficient of 1.240 and was significant at 5% level of probability. This implies that the more farmers belong to a cooperative society, the more likely the use of ICTs by the farmers. The result aligns with the prior expectations of the study. This could be because most of the farmers are members of a cooperative society.

Extension visits had a positive coefficient of 3.551 and was significant at a 10% level of probability. This implies that an increase in extension visits could lead to an increase in the use of ICTs by maize farmers. The result is in line with Umar *et al.* (2020) they found that extension visits a couple of times a year with maximum number of extension services observed was 5 times and minimum of 1 time and with an average of 1 time per year was significant. Similarly, Adejoh *et al.* (2016) who reported that extension contact was also found to be positively related to the use of radio in both urban and rural areas and at a 1% level of probability. Extension contact was also found to be positively significant to the use of television at 1% and 5% levels of probability in the urban and rural areas respectively. This implies that the higher the number of extension visits, the higher the likelihood of using radio and television for sourcing agricultural information. He further agreed that if the use of extension agents by farmers as a source of agricultural information is increased, they will adopt more improved crop technologies.

Access to ICTs had a positive influence on ICT usage by maize farmers with a coefficient of 2.879 at a 10% significant level of probability. This implies that the more access to ICTs, the higher the level of ICT usage. This is in tandem with the findings of Akweta *et al.* (2018) Radio was ranked highest with a mean score of 1.00 as the most available ICT to the respondents. This is directly followed by mobile phones, television, computers, and newspapers. This implies that radio, mobile phones, television, computers, and newspapers were the ICT sources most commonly available to the respondents.

Access to credit was found to have a positive influence on the level of usage of ICTs with coefficient of 3.7024 and was significant at 10% level of probability. This implies that maize farmers in the study area have access to credit which also influences the usage. That is a unit increase in access to credit will likely lead to an increase in the use of ICTs by maize farmers in the study area.

The finding revealed that the use of ICTs is compatible to the maize farmers at a 5% significant level of probability. This implies that ICTs are user friendly to the maize farmers in the study area as posited by Macire *et al*. (2016). They stated that another important characteristic of an innovation affecting its rate of adoption is its perceived compatibility or acceptability.

The affordability level of the maize farmers in the study area was significant at 1% level of probability. This implies that with an increase in the farmer's income, the more likely he could afford the ICTs components.

The study revealed that the variables: sex of maize farmers, household size, level of education, farming experience, farm size, cooperative membership, extension visit, access to ICTs, access to credit, compatibility and affordability of ICTs were found to influence the use of ICTs by maize farmers in the study area. While other variables like age distribution of maize farmers, marital status and complexity of the ICTs were not found to be significant.

Table 2: Factors Influencing the use of ICTs by Maize Farmers

Variables	Coefficient	Standard error	T-value
Constant	14.495	3.663	3.957
Age	0.802	2.505	0.320
Sex	1.186***	0.342	3.461
Marital status	-0.271	1.608	-0.169
Farming experience	6.987*	4.081	1.712
Household size	1.215**	0.598	2.032
Farm size	1.542***	0.237	6.508
Education	3.944**	1.909	2.066
Extension visit	3.551*	1.822	2.005
Access to ICT	2.879*	1.545	1.863
Access to credit	3.702*	1.889	1.960
Cooperative society	1.240**	0.546	2.272
Compatibility	3.342**	1.641	2.036

Variables	Coefficient	Standard error	T-value
Complexity	4.285	3.186	1.345
Affordability	4.868***	1.938	2.511
Prob > f	0.004**		
R-squared	0.553		
Adjusted R-squared	0.514		

*Note: ***, ** and * significant at 1%, 5 levels of significance % and 10%*

CONCLUSION

The findings showed that most maize farmers in the study area were male, had farming experience above sixteen years, had household sizes above 6 family members, and cultivated between 0.1-5 hectares. Education played a vital role as most of the maize farmers were graduates. Despite their years of experience, the majority of the farmers are not associated with cooperative society and lack significant access to extension contact. However, farmers tend to have access to ICTs and credit. Their income level was moderately significant as the majority of them responded that they had ₦1,000,000 and above. The factors influencing the level of ICT usage by maize farmers in the study were: sex, farm size at 1% level of probability, household size, level of education, cooperative society at 5% level of probability, farming experience, extension visit, and access to ICTs at 10% level of probability respectively.

REFERENCES

Adejoh, S. O., Edoka, M. H., & Shaibu, U. M. (2016) Comparative Analysis of the Determinants of Mass Media Usage by Urban and Rural Farmers in Kogi State. Nigeria. *Journal of Agriculture Extension, Economics and Sociology*, 14(3): 1-12, 2026; JAEES.30078. ISSN:2320-7027 SCIENCEDOMAIN international www.sciencedomain,org.

Agwu, A. E., Uche-Mba, U. C., & Akinnagbe, O. M. (2018). Use of information and communication technologies among researchers, extension workers and farmers in Abia and Enugu states: Implications for a national agricultural extension policy on ICTs. *Journal of Agricultural Extension*.12(11): 22-25.

Akeweta, J. N. Tata, L. A. & James, A. N. (2018). Information needs of farmers in Song Local Government area, Adamawa State, Nigeria. *Journal of Agriculture, Food security and Sustainable environment*, 1(1): 11.

Alfieri, L., Burek, P., Dutra, E., Krzeminski, B., Muraro, D., Thielen, J., & Pappenberger, F. (2015). GloFAS – global ensemble streamflow forecasting and flood early warning. Hydrology and Earth System Sciences, 17(3): 1161-1175. Online and Available at: https://doi.org/10.5194/hess-17-1161-2013.

Ariola, M. (2006) Principles and methods of research Ed. Publisher Rex bookstore, in. 2006 ISBN:97124583,9789712345487, pp 112-113.

Bekele, A., & Guadie, T. (2020). Multiple linear regression analysis on factors affecting maize production in Bench-Shako Zone: In case of Mizan-Aman District, Southwest Ethiopia. *Journal of Advances in Bioscience and Bioengineering*, 8: 24-30.

Food and Agriculture Organization (FAO, 2015). The State of Food and Agriculture. Social Protection and Agriculture: Breaking the Cycle of Rural Poverty. Food and Agriculture Organization of the United Nations, Rome, 2015.

Garandi, D. I., Tanko, H. S., Bukar, H. A., Bashir, A., Dasin, M. S., Chukwu, P. I., Gabul, P., & Wesley, P. (2026). Indigenous knowledge on land evaluation and soil fertility management among rural farmers in Mubi North Local Government Area, Adamawa State, Nigeria. *FUDMA Journal of Sciences (FJS)*, 9(12): 356 – 362. Retrieved from DOI: https://doi.org/10.33003/fjs-2025-0912-4286

Gichangi, A., Birachi, E., Wambua, S., Kavoi, J., Karanja, D., Muriithi, F., & Mutua, M. (2019). Factors Influencing Smallholder Farmers' Inputs Use in Major Bean Production Corridors in Kenya. *Journal of Agriculture and Food Science*, 17(1): 136-147.

Ibitola, O. R., Fasakin, I. J., Popoola, O. O., & Olajide, O. O. (2019). Determinants of maize farmers' productivity among smallholder farmers in Oyo State, Nigeria. *Greener Journal of Agricultural Sciences*, 9(2): 189-198.

Ibrahim, M. K., Adejoh, S. O., & Edoka, M. H. (2019). Sources and uses of agricultural information among rural farmers in Ijumu Local Government Area of Kogi State, Nigeria. Proceedings of the 43rd annual conference of the agricultural society of Nigeria (ASN), held on the 20th–23rd October 2009, at Abuja, Nigeria. pp. 558 -561.

Kaduna, H., Yusuf, H. A., & Yusuf, H. O. (2024). An analysis of technological factors influencing the use of information and communication technologies (ICTs) by maize farmers in Taraba State, Nigeria. *Journal of Agricultural Economics, Extension and Science.* 10(1): 80-91.

Macire, K., Robert, O., & Christopher, C. (2016). Factors affecting the use of ICTs on agricultural input information by farmers in developing countries, School of Computing and Informatics, University of Nairobi, Nairobi Kenya.

Mani, J. R., Issah, F. O., Abdussalam, Z., & Damisa, M. A. (2022). National factors influencing farmer participation in maize production in Kaduna State, Nigeria, *Journal of agriculture and environment,*18(1): 1-11 ISSN: 1595-465X (Print) 2695-236X (Online)

Omotayo, O. M. (2015). ICT and Agricultural Extension. Emerging issues in transferring agricultural technology in developing countries. In: Adedoyin SF (ed), Agricultural Extension in Nigeria. Ilorin: Agricultural Extension Society of Nigeria.pp.145-157.

Organization for Economic Cooperation and Development. (OECD (2011). The OECD'S Project on Harmful Tax Practices.
https://www.oecd.org/countries/tanzania/49755272.pdf
ISBN: 978-951-724-993-5 (printed), ISBN: 978-951-724-994-2 (*pdf*), ISSN: 1235-7618. REPORT 2012:2 Country Proposed *reference*: Caldecott J, Valjas A, Killian B and

Lounela. Table 5 Total MFA disbursements to *Tanzania*, 1991-*2001*.

Raktim, R. L. & Nivedita, D. (2019). Application of Information and Communication Technology (ICT) in Farm Management Department of Agric Economics and FM, Assam Agricultural University (AAU), in Jorhat District of India.

Ryan, T. (2013). Sample Size Determination and Power. John Wiley and Sons.

Tanko, Y. (2019). Determining the efficiency of rice production in the Kadawa rice cluster of Kano State, Nigeria. *Journal of Economic Information, 6(4), 5-10*.

Taraba Agricultural Development Programs (TADP, 2019). The impact of Taraba State agricultural programs TADP on rural farmers in Taraba State Nigeria.

Umar, M. M. (2015). Extension Communication. In: Perspectives on Mass Communication Issues: A Book of Reading 1 (Ed.) Malam, M. N. and M. B. Ali). Gidan Dabino Publishers, Kano, Nigeria, pp116-130 United Nations Economic for Latin America and the Carribbean (ECLAC), Food and Agricultural Organization (FAO), and Inter-American Institute for Cooperation on Agriculture (IICA) (2012). ICTs and the new challenges for Agricultural and rural development. The outlook for Agriculture and Rural Development in the Americas; A perspective on Latin America and the Caribbean, 115-139.

Yamane, T. (1967). Statistics: Introductory analysis, 2nd Edition, New York: Harper and Row

Yekini, O. T., Ladigbolu T. A., Adeniyi, R. T., & Adebisi, G. L. (2019), Benefits Derived from the Use of Information and Communication Technologies among Rural Farmers in Northeast Nigeria, *Journal of Agricultural Extension*. ISSN (e): 24086851; ISSN (Print); 1119944X. https://dx.doi.org/10.4314/jae.v23i3.10