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Research Article

Assessment of Smallholder Poultry Farmers' Use of Information and Communication Technologies (ICTs) in Kwali Area Council of Abuja, Nigeria

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Abstract:

ICT can be regarded as the combination of "informatics communication" and other technologies, especially communications technology. Informatics refers to the study of information, computation, and communication. This can apply to artificial systems such as computers or natural systems such as brains, genes, and living cells. Informatics technology refers to the technological application of informatics in society and is the study of the behaviour and structure of any system that generates, stores, processes, and presents information. A simple random sampling technique was used. The total sample size was 100. The questionnaire method of data collection was adopted to elicit information on the socio-economic characteristics of the farmers, their perceptions of ICT, the accessibility of ICT, and factors that affect the use of ICT technology by poultry farmers. The collected data was subjected to descriptive statistics (such as frequency tables and percentages) for analysis. The result showed that 61% of the farmers are actively participating in poultry farming; it also showed that extension service delivery made it easier for the farmers to get ICT information; and it also showed that high costs (71% of the time) were the major constraint to the adoption of ICT by the smallholder poultry farmers in the study area.

Key words: Kwali, ICT, poultry, smallholders, farmers

Introduction

The new world trend suggests large-scale changes in the manner in which education and training are planned and delivered as a consequence of the opportunities and accessibility of information and communications technology. The inception of information and communication technology has restructured the existence of modern man, especially in the context of globalization (Sennuga et al., 2023a). Assessing one's own needs and potential solutions, facilitating multi-stakeholder brainstorming, investigating alternative production technologies, encouraging access to markets and credits, training and demonstration, community learning, searching for, identifying, and coordinating data for specific clients, early warning for disasters, weather forecasts, and peer-to-peer sharing and exchange among extension are all instances of self-assessment and solution-finding activities (Sennuga et al., 2023b).

Today's world is predominantly information-driven, with information and communication technologies (ICT) increasingly becoming a constitutional driver of social and economic development (Irungu et al., 2015; Gayi and Tsowou, 2016; Francis, 2016; Sennuga, 2019). Over the past two decades, there has been a significant explosion in ICT adoption in sub-Saharan Africa (Conger, 2015). However, Chikaire et al. (2017) singled out considerable restraining circumstances that affect the use of ICT, including agriculture, globally as well as in developed countries. Infrastructure issues; poor connectivity to global networks; maintenance issues; agriculture is contemplated to be the fastest-developing company in ICT use on any continent. SMS can be used for a variety of functions, from face-to-face communication to market information (Sennuga et al., 2020). In sub-Saharan Africa, the mobile communication system, the Global System for Mobile Communication (GSM), means that the sector now owns personal ICT devices, exclusively computers, tablets, and mobile phones. This trend also includes small farmers using ICT (mostly SMS-enabled mobile phones) (GSMA, 2021). The absence of means of disseminating information is believed to act as a constraint to development because of the importance of information provision in

"capacity building" and "empowerment of communities" (Idu et al., 2023). The presence of information provides avenues for meaningful decision-making, and substitute means for problem-solving are examined for final decisions. Information is the fundamental raw material from which alternatives emerge.

Understanding and addressing global agriculture developments, both advantageous and not, is crucial to enhancing smallholder livelihoods, where ICT can play a primary role. In addition to increasing competition and efficiency in the agriculture sector, the ongoing rise of globalization and integration of the food markets has created rare opportunities to include more smallholder farmers in the distribution networks. Yet, in the same vein, agriculture faces a variety of contemporary and extreme challenges, specifically in developing nations exposed to price shocks, climate change, and persistent deficiencies in infrastructure in rural areas (Adeyemi et al., 2023, Sennuga et al., 2023b).

Even after receiving information, people still encounter unclear and outdated information (Adekoya, 2016). In this context of globalizing and enhancing agriculture, the need for information becomes acute. The disadvantage of being a smallholder does not end there. Services in the economic and insurance sectors are typically unattainable and underdeveloped. The disadvantage could be mitigated by important middlemen like manufacturing organizations and rural institutions, but in many places, the former are still developing and the latter are ineffective and opaque. Both require various forms of financial and technical assistance to grow and become inclusive and efficient. The efficient use of ICT can address many of these difficulties and other issues (Sennuga et al., 2023a).

Development of Agriculture and Communication

Communication plays a wonderful role in agricultural extension. Communication has a role to play and has benefits, especially in extension and agricultural information organizations. To communicate in agricultural terms, farmers, extension agents, and research scientists must exchange related agricultural data with one another and with other stakeholders (such as farmers and extension agents). However, agricultural outreach communication within the improvement context is specifically focused on improving the contributors' standard of living through the process of replacing agricultural information between each other and others as well (Ayeni et al., 2023). As a result, the acceptance of recommended technologies and programs may be linked to the efficiency of communication strategies, channels, and procedures. Due to the barriers within the traditional and formal communication channels, ICT software has become more pertinent; therefore, a more pleasant and advantageous mechanism for improving communication in the agricultural context is desired (Omotayo, 2015). As a result, ICT has been introduced as a significant advancement in agricultural development. Communication, as described by Rogers and Shoemaker, is the process whereby messages or information are passed from a sender to a receiver. The authors determine that communication is a part of the social exchange system. The following stages are involved in the diffusion of innovation:

1) Awareness stage 2) Interest stage

3) Evaluation stage 4) Trial stage

5) Adoption stage.

Extension system and agricultural development in Nigeria.

Another term for "agricultural advisory services" is agricultural extension. Extension is the process of teaching farmers agronomic methods and skills so they can increase their production, food security, and standard of living. The basic premise of extension work is to help farmers resolve their problems using clinical information in order to improve their farming practices, income, and standard of living. They divided the duties of extension agents into two straightforward categories: those relating to farmers and those relating to their supervisors. In a nutshell, they claim an extension agent gets ready for a field trip with his contact farmers, teaches them, suggests new methods, and motivates them to use available technologies. In order to be equipped and to gain feedback on their extension service, they also communicate with their supervisor by attending meetings and training sessions. Extension personnel have the chance to offer suggestions from the field to other extension personnel, research organizations, and input organizations (Nwali et al., 2022).

Conceptual Framework

Information and communication technology (ICT) use is directly correlated with the expansion and improvement of market channels and systems (Adeyemi, et al. 2023). ICT usage levels are sometimes used to describe how well a business is doing in the market. In other words, ICT use is anticipated to influence rice marketing in the form of decreased costs, fewer issues with distance marketing, improved marketing channels, etc. Information is arguably the most significant variable in marketing, and ICT is among the most helpful instruments for giving farmers and traders access to information at an extremely affordable price. However, farmers can decide whether or not to employ ICT (Ajah et al., 2023). As a result, several characteristics, including sex, age, years of education, marketing channels, the cost of marketing activities in the markets, and having access to communication and information technologies, can influence how ICT is used in the marketing of rice (Barnabas et al., 2023). The utilization of ICT in marketing systems has consistently had a favorable influence on farmers' accessibility to market data and, ultimately, their ability to support themselves. This is illustrated in the Figure 1 below.

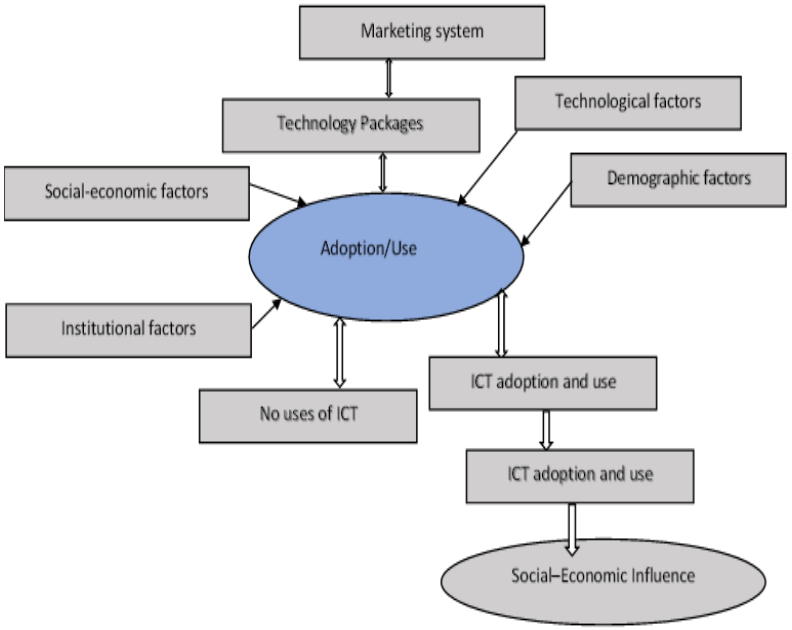

Figure 1: Conceptual framework showing factors influencing the use of ICT in rice marketing (adopted and modified from Jianmei and Chen, 2014).

Boko Haram uprising and agriculture development in Northern Nigeria

Since 2009, Nigeria has been in the grip of a violent Muslim insurgency led by the extremist sect widely referred to as Boko Haram. Over 15,000 people are killed in Boko Haram attacks across northern Nigeria, with thousands displaced. The insurgency has negatively impacted agricultural productivity and distribution networks from the north to the southern part of the country and the other way around (Adebisi, 2016; Kah, 2017; Adelaja, 2019). Boko Haram virtually means that "Western education is divinely forbidden" and therefore ought not to be allowed to prevail among nations, particularly Muslim-dominated states. This evil cluster has attacked and destroyed churches, mosques, schools, police stations, and personal and public facilities. Boko Haram is the most dangerous insurgent group in Nigeria and has led to the displacement of farmers in the northeast of Nigeria and affected the agricultural development of the region. This uprising has caused several farmers to relocate to alternative places wherever there's peace to avoid wasting their lives, forcing them to leave their farmlands behind as they are not mobile (Adetiloye 2014, Mustapha 2015).

The activities of the Boko Haram uprising and the Fulani herdsmen have negatively influenced agricultural development within the northeast of Nigeria and its environs. Honestly, the damaging result of the Boko Haram insurgency in northeastern Nigeria continues to be a source of worry for all and sundry. The menace caused by the Boko Haram insurgency in the North has been an excellent threat to the Nigerian business atmosphere as farming and alternative business activities are being harmed. Unsettled cattle rearers who are taking their cattle out for grazing have abandoned their businesses because the atmosphere is no longer safe for them. The lives of those who are still concerned within the agri-business industry are also at stake as a result of an attack by Boko Haram that will occur at any moment. This has led to decreases in milk production and meat production and, by extension, a rise in the worth of the cattle (Kah, 2017). Poultry farmers in the region also do not realize their business is profitable anymore, as the folks getting the products are displaced. The evil activities of Boko Haram are not solely felt in Nigeria; they are also felt in other components of Africa.

Research objectives

The objectives of this study are to discuss the variables influencing the rate at which the smallholder rural farmers of Kwali Area Council of the FCT, Abuja adopt the use of ICT. Specifically, the study intends to:

1. describe the socio-economic characteristics of the respondents in the study area.

2. determine the perceptions of the smallholder poultry farmers on ICTs usage in the study area.
3. ascertain the level of accessibility of ICTs by the smallholder farmers.
4. identify the factors affecting usage of ICTs by the smallholder poultry farmers.

Methodology

Description of the study area

The study area is the Kwali Area Council of the Federal Capital Territory of Nigeria. It is one of the six area councils of the FCT. Kwali is located in the south-west part of the FCT and is bounded by the Gwagwalada Area to the north-west of Kuje. It has an area of 1,206 km2 and a population of 85,837 at the 2006 census. The area postal code is 904105. The 10 wards that make up Kwali Area Council are Ashara, Dafa, Gumbo, Kilankwa, Kundu, Kwali, Pai, Wako, Yangoji, and Yebu. Each ward is headed by a councilor. One profession that the people of Kwali Area Council are famous for is pottery. Indeed, it is the country home of the world-famous potter woman, Dr. Ladi Kwali, whose image currently graces the 20-naira bill. Another is cloth-making.

Sample size and data collection

A simple random sampling technique was used in this research study. This sampling technique is most appropriate for this research project because it ensures that every member of the population has an equal chance of being selected. The sample size used for this research project was one hundred (100) respondents to be selected randomly from within the 10 wards of Kwali Area Council. A questionnaire and survey method of data collection was adopted for this research project. The questionnaires were distributed among large populations to gather responses. The questionnaire contained closed-ended questions for randomly selected individuals (respondents) from various districts. The primary data in the form of a well-structured questionnaire was administered in two ways: yes/no or agree/disagree, and a scale of questions, in which there were

questions of agree, disagree, undecided, strongly agreed, and strongly disagreed, will be used for this research project. The questionnaire will be in three (3) sections. Section A contained personal and socio-economic characteristics of the smallholder poultry farmers in the study area, while Section B contained questions in the area of the research study, Section C contained questions on the accessibility of ICT, and Section D contained questions on factors affecting ICT usage by the smallholder poultry farmers.

Data analysis

The analytical tools that were used in this study to achieve the stated objectives were descriptive statistics such as frequency counts, percentages, and mean scores. These will be used to analyze objectives 1, 2, 3, and 4. The table and percentage were used to summarize and analyze the data simply to enhance easy comprehension and clarity of the data generated. In the percentage presentation, the option with the highest percentage was assumed to be the most favourable. This was determined by using the Statistical Package for Social Sciences (SPSS) to describe the socioeconomic characteristics of the livestock farmers.

Result and Discussion

Distribution of respondents based on the socio-economic characteristics of the smallholder poultry farmers in the research area.

The result in Table 1 shows that a large proportion of smallholder poultry farmers in the area were male (57%), while females accounted for 43%. The majority of the poultry farmers were between the ages of 24-35 and 36-45, while 18-23 years (10%), 46-55 (19%), and 56 and above accounted for 11%. The majority of the respondents were married (47%), while 30% were single, 10% were divorced, and 9% were widows. The household sizes of the respondents were 1–5 (57%), 6–10 (39%), and 11–15 (6%), respectively. Family size is a function of the availability of labor. The study indicated that the majority of the respondents have tertiary education (56%), and 26% have secondary education. The data presented in the table below indicated that the level of literacy of the sampled respondents was relatively high. 61% of the poultry farmers in the study area were full-time poultry farmers, while 39% were part-time poultry farmers. The result indicated that the poultry farmers are operating as smallholders. The respondents in the study area had farming experience of 1–10 years (58%), while 11–20 had 40%, and 21–30 had 2%. Farming experience helps farmers improve their productivity through practical knowledge acquired over time. The productivity levels of the respondents were 10–30 (26%), 31–50 (41%), 51–70 (29%), and 71–90 (4%). The result indicated that the farmers' productivity ratio is relatively low. The productivity ratio indicates how well the farmers utilize the knowledge gained over years of farming experience.

Socio-Economic Variables	Frequency	Percentage%
Marital Status		
Male	67	67.0
Female	33	33.0
Age Range		
18-23	10	10.0
24-35	30	30.0
36-45	30	30.0
46-55	19	19.0
56 and above	11	11.0
Marital Status		
Single	34	34.0
Married	47	47.0
Divorce	10	10.0
Widow/Widower	9	0,9
Household Size		
1-5	55	55.0
6-10	39	39.0
11-15	6	6.0
Educational Attainment		
No Education	9	9.0
Elementary Education	9	9.0
Secondary Education	26	26.0
NCE/HND	22	22.0
First degree and above	34	34.0
Nature of Poultry Farming		
Full-time	61	61.0
Part-time	39	39.0
Farming Experience		
1-10	58	58.0
11-20	40	40.0
21-30 **Level of Productivity**	2	2.0
Level of Productivity		
10-30	26	26.0
31-50	41	41.0
51-70	29	29.0

Table 1: Distribution of respondents according to their socio-economic traits

This discovery supports that of Mwangi and Kariuki (2015) who found that male-led households are more likely to embrace agricultural technology, because of their leading role; facilitating the planning and operation of the farm to improve productivity and maintain the well-being of the family.

Variables	Frequency	Percentage
Radio	32	32.0
Smartphone	43	43.0
Radio and Smartphone	3	3.0
Television and Smartphone	6	6.0
Laptop Computer	16	16.0

Table 2: ICT innovations utilized by farmers in the study area.

The survey result demonstrates that 32% of the respondents use radio to access information; as some of them are not educated and might not be able to use or afford an advanced form of ICT, they settled for the one that is within their reach. The result also demonstrated that 43% of the respondents indicated that they employed smartphones when seeking information, which is a fast and easy way for them. While 3% of the respondents made use of both radio and smartphones, 6% of the respondents used both television and smartphones, and about 16% of the respondents used laptop computers on their poultry farms.

S/N	CATEGORY	VERY EASY F (%)		EASY F (%)		MODERATELY EASY F (%)		HARD F (%)	
1	Access to ICT gadget	24	24.0	24	24.0	22	22.0	30	30.0
2	Access to internet source	18	18.0	27	27.0	43	43.0	12	12.0
3	Access to grants or donations	2	2.0	11	11.0	46	46.0	41	41.0
4	Access to extension service	5	5.0	17	17.0	47	47.0	31	31.0
5	Access to loans	4	4.0	5	5.0	10	10.0	81	81.0

Table 3: Major of effective adoption of ICT innovation in the study area

The survey result shows that 24 percent of respondents strongly agreed that they had very easy access to ICT. Another 24% agreed that they had easy access to ICT, 22% said it was moderately easy to get access to an ICT gadget due to cost, and 30% said it was difficult to get access to an ICT gadget due to cost.

The result also showed that 18% indicated that it was very easy for them to access internet services due to their proximity to an internet source, while 27% agreed that it was fairly easy. Another 43% accepted that it was moderately easy to access internet services in the study area, and 13% of the respondents indicated that access to internet services in the area was extremely difficult due to certain conditions. Further investigation revealed that the respondents (2%) indicated that it was very easy for them to get access to grants and donations, while (11%) revealed that it was easy for them. Another 46% of the respondent farmers revealed that it was moderately easy for them to receive grants and donations from non-governmental organizations, or NGOs, and then 41% indicated that it was very difficult for them to have access to those grants and donations that would enable them to upgrade their farms. This can be attributed to the fact that most of them do not have any idea how to go about the whole process of vying for a grant slot from those NGOs. This indicates that more poultry farmers will do well in the study area if grants and donations are available to them.

The survey further revealed the results for access to extension services in the study area: 5 percent of the poultry farmers in the study area indicated that access to extension services was very easy for them. While 17% indicated that it was easy for them to get access to extension services, though not too easy, 47% of the respondents said that it was moderately easy for them to access extension services in the study area, while 31% of the majority indicated how difficult it is for them to access extension services in the study area. The study further revealed that if they had access to ICT and internet services, it would have been easy for them to reach extension agents by calling (via video or audio) or chatting them up, which would have helped improve their productivity and solve some of the problems they face as poultry farmers in the study area.

The result of the study further revealed that the majority of the respondents (81%) in the study area do not have access to loans for their farms, and this has limited their productivity, while 10% indicated that though it was not really easy for them, they could still have access to loans for their poultry business. The minority of respondents (5%) and the majority (4%) indicated that it was very easy for them to get access to loan services as they could afford to pay back at the due date and had collateral in case of unforeseen events. This is in solidarity with the findings of Adesina (2012), which state that, "Although the agricultural sector accounts for 44% of the GDP, it only receives 2% of all loans made by commercial financial institutions in Nigeria." Sadly, the agricultural sector is undercapitalized as a result of the commercial banks' high demands for collateral, their inability to create suitable credit instruments for this industry, the high perceived risks associated with lending to it, and their general hostility towards agriculture on the part of banks.

S/N	CONSTRAINTS	STRONGLY AGREE F (%)		AGREE F (%)		STRONGLY DISAGREE F (%)		DISAGREE F (%)	
1	Complexity of ICT and lack of awareness	31	31.0	64	64.0	5	5.0	0	0.0
2	High cost of ICT technologies	71	71.0	21	21.0	3	3.0	5	5.0
3	Limited access to information on its use	51	51.0	40	40.0	0	0.0	9	9.0

Table 4: Factors militating against the use of ICT

Results from Table 4 above show that the majority of the respondent farmers (64%) agreed that the complexity of ICT was one of the main reasons why they do not use it. while 31% strongly agreed that one of the major reasons for the limited use of ICT was its complexity and lack of awareness. (5%) strongly disagreed, stating that the complexity and lack of awareness of ICT have nothing to do with its adoption or usage.

A further survey showed that the high cost of ICT technology was another strong reason for its lack of use, as 71% of the respondents' majority strongly agreed to it, while 21% only agreed, with 3% strongly disagreeing and about 5% minority disagreement. Reduced costs of ICT gadgets, among others, would help improve their use by the poultry farmers in the study area. Further surveys also revealed that limited access to information on ICT is a major constraint to the use of ICT technology. With 51% of the respondent farmers strongly agreeing that lack of information and training is a major reason why they do not use ICT, 40% of the respondent farmers also agreed that lack of information and training is a barrier to the use of ICT by the rural poultry farmers in the study area. Another nine percent of the respondents disagreed that the lack of information is a barrier to the use of ICT technology in the study area. This is in line with the findings of Hinduja (2014), which established that lack of awareness about ICT tools and content-related issues were the major constraints faced by farmers.

Conclusion

This research studied the role of information and communications technology (ICT) among small-scale poultry farmers in the federal capital territory of Nigeria. Based on the outcome emanating from this research work, the study concludes that the problems militating against Kwali Area Council when smallholder poultry farmers ignore the benefits of ICT as a means of improving their farms cannot be overemphasized. This is because new problems will arise daily in addition to the old ones. As a result, attitude requirements must be considered. Therefore, the identification of the role of ICT among smallholder poultry farmers is paramount. Based on the results of this study, there is a lack of awareness and access to information and resources. Lack of access to credit and other financial resources, lack of educational and technical skills, lack of farmer training, lack of networking opportunities, high cost of technologies in the market, lack of incentives, and lack of finance have posed major impediments to the active use and adoption of ICT as an improvement in poultry production by smallholder poultry farmers.

Recommendation

The recommendations stated below are therefore based on the findings of this work:

1. There should be a creation of awareness, which will convey the knowledge and skills that will contribute to alleviating poverty, changing livelihoods, improving the environment, and having a positive effect on ICT in poultry farming.

2. The government, in collaboration with the CBN, should provide avenues for farmers to access agricultural funds to enable them to work well and see improvements in their area of specialization. As agriculture generates about 44% of the nation's revenue, different programs and departments should be set up that will checkmate and offer solutions to the problems of smallholder poultry farmers and farmers at large.

Conflict of interest

The authors declare that they have no conflict of interest.

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