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FACTORS ASSOCIATED WITH THE USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES IN TRAINING FARMERS ON FARMING TECHNIQUES BY EXTENSION AGENTS IN SOUTHWESTERN NIGERIA

[1]Akintonde J.O., [1]Akintaro O.S., [1]Rahman S.B., [2]Bamidele B.S., [1]Oladosu I.O. and [1]Ogunwale, A.B.

[1]Department of Agricultural Extension and Rural Development, PMB 4000, Ladoke Akintola University of Technology, Ogbomoso, Oyo State, Nigeria.

[2]Department of Agricultural Extension and Management, Federal College of Agriculture, P.M.B. 5029, Moore Plantation, Ibadan, Oyo State, Nigeria.

ABSTRACT: *This paper presents historical information on ICTs utilization concerning agricultural production. An overview of factors associated with ICTs usage in training farmers on farming techniques by EAs in south-western Nigeria and perceived factors that determine the ICTs utilization among EAs were highlighted. The multistage sampling procedure was used in selecting 287 EAs in Ogun and Oyo States of Southwestern Nigerian. A structured questionnaire was used to obtain relevant information for the study. Data collected were analyzed with frequency distribution, percentages, and mean as the main descriptive statistical tool while a t-test was used to make inferences about the data collected. The mean age of the EAs was 38.25 years, majority (99.0%) of the respondents sampled were married, while the mean year of experience in extension service is 8.13years. Affordability (84.0%), accessibility (90.9%), level of education (73.5%) were the major identified factors associated with the choice of ICTs to be used in training the farmers on farming techniques by the EAs. ICT device ownership status (80.1%) and ICT knowledge level of EAs were among the perceived factors responsible for the frequency of use of ICTs in disseminating agricultural production techniques to farmers by the EAs. There is no significant difference in the use of ICTs in training farmers on farming techniques by the EAs of the selected states. Hence the study recommends that adequate ICT facilities should be provided at affordable prices and accessible to the EAs. Government should encourage ICTs' knowledge level of EAs through the provision of regular training and internet facilities should be made available with a constant power supply to encourage technology transfer and increase in food production in the area and Nigeria at large.*

KEYWORDS: training, farming techniques, extension agents**,** ICTs

INTRODUCTION

The application of Information and Communication Technology (ICT) to agriculture is a pronounced abstraction. With ICT rural farmers are directly linked with information sources to access new technology generated through research. Both farmers and Village Extension Agents (VEAs) are in frequent contact, and information can be transfer without any hitch or delay from researchers to farmers via VEA. The application of ICT across different sectors of the global

economy has resulted to increase in production efficiency and high farm yield. The agriculture sector in the global economy is one of the industries experiencing enormous ICT application in all spheres of its operations (Ayisi and Kozari, 2021). Daum (2020) observed that in recent years, ICTs had become one of the main driving tools used by farmers to manage the essential factors of production (land, labour, capital, and soil) in agriculture. ICT applications have the potential to identify and find a solution to some of the numerous problems faced in the field of agriculture, which includes prolonged droughts, pest and disease outbreaks, seasonality and spatial dispersion of farming; high transaction costs and information asymmetry (Anh et al., 2019). ICTs can increase smallholder's access to timely extension information while addressing many of these challenges by reducing the cost of extension visits, enabling more frequent two-way communication between farmers and VEAs, and improving VEAs' accountability as well as ease of discharging responsibilities to rural farmers.

ICTs also enhance access to private information from social networks, thus facilitating learning from one's peers, which is crucial for technology adoption. By increasing communication linkages among different stakeholders in agriculture (farmers, extension agents, and research institutes), ICTs can improve the flow of relevant information among all these agents. World population is expected to surpass the 9 billion mark by 2050, and agricultural production will need to increase by 60 percent from its 2005/2007 levels to meet this additional food demand. ICT applications can make a significant contribution to meet this future global food needs. ICT can do so by collecting and sharing timely and accurate information on weather, inputs, markets, and prices; by feeding information into research and development initiatives; by disseminating knowledge to farmers; by connecting producers and consumers, and through many other avenues (FAO, 2017). Different farming production techniques are communicated through different ICT tools via extension training of farmers in order to ensure increase in the level of food production. It is on this note that this study was designed to determine the factors associated with the use of ICTs in training farmers on farming techniques by Extension Agents (EAs) in the South-west of Nigeria. Specifically, it described the socio-economic characteristics of the respondents; investigate ICTs frequently use by EAs, and examine perceived factors responsible for the frequency of use of ICT facilities among EAs in the study area.

METHODOLOGY

The study was carried out in the Southwestern States of Nigeria. The study employed a multistage sampling procedure. The first stage involved the selection of 33.3% of the states (Ogun and Oyo). Secondly, 80% of EAs in each state were selected. During the third stage, 108 EAs and 179 EAs were randomly selected from Ogun State and Oyo State respectively which amounted to a total of 287 EAs that constituted the sample size of the study. Structured questionnaires were used to obtained relevant information from the respondents relevant to the objectives of the study. The descriptive statistical tools used include frequency distribution, percentages, and mean, while T-test analysis was conducted to determine the significant difference in the use of ICTs among the EAs of the selected States.

RESULTS AND DISCUSSION

Socio-Economic Characteristics

Table 1 below revealed that more than half of the Extension Agents (EAs) sampled in both States were between the age range of 31 – 40 years (Ogun (58.3%) and Oyo (57.5%) with the mean age of 37.84 (Ogun) and 38.50 (Oyo) respectively. The pooled percentage was 57.5% and the mean of 38.25 years. The results imply that the EAs in both States were in their active age of service and a stage that allows them to be aware of technologies in vogue and that are expected to influence their level of utilization of different ICTs in training farmers on different farming techniques in the States. It also revealed the gender distribution of EAs and the result shown that the majority of the EAs sampled from Ogun State (85.2%) and Oyo (93.9%) were male, while the pooled percentage was 90.6% and the female percent was14.8%, and 6.1% for both Ogun and Oyo States. This result implies that both genders are involved in the extension service. This is an indication that extension service is a no gender bias service. This may also suggest the fact that males and females are involved in Nigeria's extension service. Most of the EAs sampled in Ogun (99.1%) and Oyo (98.9%) were married, while only 0.9% (Ogun) and 1.1% (Oyo) were single.

The pooled results were 99.0% (married) and 1.0% (single). This implied that the majority of the EAs in both Ogun and Oyo States were married. This status is expected to have a positive impact on their job performance and professionalism and a significant influence on the utilization of ICTs and in disseminating agricultural technologies to their respective clients. The fact that they are married suggests that they would be responsible and possess self-initiative in taking rational decisions that would encourage the transfer of appropriate information with the appropriate ICT gadgets at the right time. Also, their family responsibilities will make them serious about their jobs and make them available for personal training that will improve their competency of the use of the ICTs in providing extension services to their farmers in the two states. It also indicated that most of the respondents in Ogun (80.6%) and Oyo (78.8%) were Christian and 19.6% (Ogun) and Oyo (21.8%) practices the Islamic religion. This implies that both Christianity and Islam formed the major population of religions practiced in the southwestern part of Nigeria. This also indicates that extension services have no restriction for religion and the use of ICTs in training farmers on different farming techniques. Also, their religious afflictions will enable them to work with people in their areas of jurisdiction as Christianity and Islam are the two major religions in the sampled states. This will enhance their group formation ability and make them favourably disposed to the application of ICTs in providing extension services to the farmers.

Most of the EAs in both states were first degree (BSC/B.Tech) holders (Ogun (57.4%), Oyo (62.0%); almost equal proportion, 11.1% (Ogun) and 11.7% (Oyo) holds Ordinary National Diploma (OND); 13.9% (Ogun) and 7.8% (Oyo) holds Higher National Diploma (HND). Furthermore, 13.9% (Ogun) and 3.9% (Oyo) holds National Certificate of Education (NCE); while 3.7% (Ogun) and 14.5% (Oyo) were master degree holders. This implies that the majority of the EAs in the two States (Ogun and Oyo) hold relevant educational qualifications. Their educational status is expected to have an influence on their ICT literacy level and encourage its use in training farmers on farming techniques. However, this finding revealed that the crop of extension personnel

in the two states are highly literate and possibly will have no difficulty in understanding the necessary concept and application of ICTs in agricultural extension service delivery. Therefore, with necessary ICTs supports and training, the extension agents will have no problem whatsoever in the application of ICTs in disseminating improved farm technologies and practices to farmers in the two States. Table 1 also reveals that 36.1% (Ogun) and 35.2% (Oyo) of the respondents had between less and equal to 5 years of experience in extension services as a profession, 38.9% (Ogun) and 40.8% (Oyo) had between 6.10 years of experience, 13.9% (Ogun and 15.6% (Oyo) had between 11 – 15 years of experience, while 11.1% (Ogun) and 8.4% (Oyo) had above 15 years of experience as at the time of data collection process. The mean years of experience of the EAs in extension service were 8.28 (Ogun) and 8.03 (Oyo) with the Pooled of 8.13. The results imply that majority of the respondents had between 6 – 10 years of working experience. The difference in their years of experience may be due to variations in their years of engagement into extension service as a profession. And their years of experience in extension service may also influence their expertise in the utilization of ICTs in training farmers on different farming techniques in the study area.

Table1: Distribution of Respondents by Socio-Economic Characteristics

	*Frequency (Percentage)		
Socio-economic variables	**Ogun (n = 108)**	**Oyo (n=179)**	**Pooled (n=287)**
Age (years)			
≤3015(13.90)	18(10.0)	33(11.5)	51(17.8)
31-40	63(58.3)	102(57.0)	165(57.5)
41-50	23(21.3)	47 (26.3)	70(24.4)
Above 50	7(6.50)	12 (6.7)	19(6.60)
Sex			
Male	92(85.2)	167 (93.9)	260(90.6)
Female	16(14.8)	11 (6.1)	27(9.40)
Marital status			
Married	107(99.1)	177(98.9)	284(99.0)
Never married	1(0.9)	2(1.1)	3(1.0)
Religion			
Christianity	87(80.4)	140(78.2)	260(90.6)
Islam	21(19.6)	39(21.8)	60(20.9)
Educational Level			
OND/HND/NCE	42(38.9)	40(22.4)	84(29.2)
BSc/B.Tech	62(57.4)	111(62.1)	173(60.3)
MSc/M.Tech4	(3.70)	26(14.5)	30(10.5)
Years of experience in extension service			
≤5 39	39(38.9)	63(35.2)	102(35.5)
5-10	42(38.9)	73(40.8)	115(40.1)
Above 10	27(25.0)	43(40.0)	70(24.4)
Mean:	5.96	6.19	6.10

Source: Field Survey, 2012
Figures in parentheses are percentages

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Factors Associated with the Use of ICTs among EAs

This section provides the detail on those factors which may be responsible for the choice of ICTs used among the EAs. Table 2 reveals that 78.7% and 87.2% of the EAs in both Ogun and Oyo states indicated affordability of ICTs as part of the factors which were considered being responsible for the choice of ICT usage among the EAs of the two states. Almost all ((89.8%) (Ogun)), (91.6%) (Oyo)), and more than half ((59.3%) (Ogun); (54.7%) (Oyo)) of EAs indicated accessibility, religion, while 75.9% (Ogun) and 72.1% (Oyo) indicated level of education as part of the determinant factors which may account for the choice of ICT usage among the EAs. More than half (56.5%) of the EAs in Ogun State and 54.2% of them in Oyo state indicated age as part of the factors which may be associated with the use of ICT in training farmers on different farming techniques in the area, while only 26.9% and 22.3% of the EAs in Ogun State and Oyo state indicated other factors (such as cost of maintenance/use, convenience, nature of the audience and agricultural message content, etc. may determine the choice of ICT usage among the EAs. This finding implies that certain factors exist and have a significant effect on the choice of ICT facilities that may be used by the EAs. The perusal of factors mentioned by the extension agent reveals the need to make ICT facilities affordable and accessible to the EAs and develop a short-time ICT literacy program for EAs and farmers to enhance the use of ICTs in extension service in the two States. Also, farm information packaging with the use of ICTs by EAs should be critically looked into to enhance the extension staff competency and ability to use ICTs in training farmers on different farming techniques in the study areas.

Table2: Distribution of Respondents by Factors Determining Choice of ICTs among EAs

	*Frequency (Percentage)		
Factors	**Ogun(n = 108)**	**Oyo (n=179)**	**Pooled (n=287)**
Cost/Affordability	85(78.7)	156(87.2)	241(84.0)
Accessibility	97(89.8)	164(91.6)	261(90.9)
Religion	64(59.3)	98(54.7)	162(56.4)
Level of education	82(75.9)	129(72.1)	211(73.5)
Age	1(56.5)	97(54.2)	158(55.1)
Conveniences	29(26.9)	40(22.3)	69(24.0)

Source: Field Survey, 2012
Figures in parentheses are percentages
***Multiple responses**

Perceived Factors Responsible for the Frequency of Use of ICTs

Table 3 below shown that 85.2% of the EAs in Ogun State and 75.4% in Oyo state indicated ownership status of some of the ICTs as part of the determinant factors that may be responsible for the frequency of use of ICT facilities, 88.0%, 82.4% and 63.9% of EAs in Ogun State, 84.4%, 77.7% and 59.2% of them in Oyo state indicated ICT knowledge level of the individual EA, power supply stability and availability of agricultural extension technology as part of the factors which

may be responsible for the frequency of use of ICT. Other factors include internet facility availability and cost of ICT facilities as indicated by EAs in Ogun (72.2%) and Oyo (67.6%). This implies that several factors determine the frequency of use of most of the ICT facilities as perceived by the sampled EAs in the selected states. This finding reveals the need for government to support extension agents in owning ICT facilities, and possibly provide them with recharge card allowance as the majority of them use GSM phones to contact farmers and send extension messages to them. They suppose not to use their salaries for official purposes. Also, the need for government to establish public viewing centres in rural areas becomes imperatives in this era of knowledge-driven agricultural production systems. Public viewing centres for farmers to gather at the same point for extension purposes will facilitate the dissemination of improved agricultural technologies, create rooms for information sharing and exchange of ideas among farmers, and establish trust and confidence among the EAs.

Table3: Distribution of Respondents by Perceived Factors Responsible for the Frequency of Use of ICTs among Extension Agents

*Frequency (Percentage)			
Perceived factors	**Ogun(n = 108)**	**Oyo (n=179)**	**Pooled (n=287)**
Ownership status	92 (85.2)	135 (75.4)	227 (80.1)
ICT knowledge level	95 (88.0)	151 (84.4)	246 (85.7)
Power supply stability	89 (82.4)	139 (77.7)	228 (79.4)
Availability of agriculture	69 (63.9)	106 (59.2)	175 (61.0)
Internet facility availability	66 (61.1)	97 (54.2)	163 (56.8)
Cost of ICT facilities	78 (72.2)	121 (67.6)	199 (69.3)

Source: Field Survey, 2012
Figures in parentheses are percentages
***Multiple responses**

Test of Significant Difference between the Utilization of ICTs among the Respondents of the Selected States

For this test, T-test analysis was carried out and the result revealed that there is no significant difference in the utilization of ICTs among the EAs of Ogun and Oyo states. This is because the t-value is negative (-0.528) and far below the recommended significant value (0.599) which may suggest that a significant difference exists between the EAs of the selected states. The result implies that there is no variation in the utilization of the identified ICTs among the EAs of the two States. A fact that may suggest a significant relationship in the extension services, extension development and extension system in the selected States of Western Nigeria.

Table4: T-Test Analysis Showing Significant Difference between the Utilization of ICTs by EAs of the selected States (Ogun and Oyo)

Pair Variable	Mean Difference	t-value	p-value	Result	Decision
Ogun State	4.13				Accept H_0
Oyo State	4.28	-0.528	0.599	NS	

Source: Computed Data, 2012.
Sig: (2 – tailed)
NS: Not Significant
H_0: Null hypothesis

CONCLUSION AND RECOMMENDATIONS

The results of the study reported here indicated that extension services involved both genders of different age groups and different educational backgrounds which were anticipated to influence the use of ICTs in training farmers on farming techniques. The EAs indicated different years of experience with mean years of 38.25 in extension service. It was revealed that some factors are associated with the use of ICTs among the EAs in disseminating agricultural technologies to farmers through the extension training in the selected States of Western Nigeria. There is no significant difference in the use of ICTs among the EAs of the selected States. It is on this background the study recommends that there is a need for the government to encourage extension service delivery among the EAs. Adequate ICT facilities should be provided at affordable costs if not free and they should be accessible to the EAs. Government should encourage ICTs knowledge level of EAs through the provision of regular training and finally, internet facilities should be made available with a constant power supply to encourage technology transfer to farmers and increase in food production in the area and Nigeria at large.

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