APPLICATION OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) IN RURAL AGRICULTURAL PRODUCTION IN IMO STATE.

[1]Chukwu, A.O and [2]F.E. Nwarieji
[1]Department of Agricultural Economics, Extension and Rural
Development. Imo State University, Owerri.
andychuks2009@yahoo.com
[2]Department of Agricultural Science, Alvan Ikoku Federal College of
Education, Owerri, Nigeria.

Abstract

The study examined application of Information and Communication Technology (ICT) in Rural agricultural production in Imo State. Specifically, it determined the role of ICT in rural agricultural production; determined measures for enhancing application of ICT to rural agricultural production and ascertained constraints to the application of ICT in rural agricultural production. The three agricultural zones (Okigwe, Owerri, Orlu) of the state were studied. Extension workers and contact farmers (C.F) were the target population with a sample frame of 1,582. Through proportionate sampling technique, six hundred and forty eight (648) contact farmers and one hundred and forty three (143) extension workers were selected. Fifty percent (50 %) of each group were randomly sampled for the study. A structured questionnaire was used to collect primary data, and analyses were carried out using mean scores, standard deviation and t-test statistic. The hypotheses were tested using t-test at 5 % level of significance. Results showed that ICT play significant roles in providing relevant agricultural information to rural farmers. Lack of basic amenities like electricity, computer networks, farmer illiteracy were found to affect the application of ICT in rural agricultural production. Results further revealed that to enhance ICT application, research institutes, State and Federal governments should put their ace together in providing adequate education to farmers and retraining of extension workers towards information on computer age, and get rural farmers who are the major actors in rural agricultural production involved in vital decision marking. The study recommends farmer orientation on the need and use of ICT in rural agricultural production.

Keywords: Information and Communication Technology, Rural Agricultural Production.

Introduction

In Nigeria, like other developing countries, Information and Communication Technology has been widely used, but for agricultural production, it is still mostly limited. Information and Communication has connected the world globally and is now changing human life and social consciousness dynamically. It has emerged as a best tool for information sharing and mutual communication due to its fast development; it has influenced rural agricultural production in most developed countries. Agricultural production involves activities such as, cultivation of crops, rearing of animals and preparation of products into forms that could be used by man, processing, packaging, storage and marketing of agricultural products. Gerard (1983) posited that the promise of information and communication technology in agricultural production is that it can energize the collection, processing and transmission of data resulting in faster extension of quality information to more farmers in a bottom-up and interaction means of communication.

As stated by Reiniche (1994), Information acquisition by professional in agriculture is fundamental to the development of the sector. Hence, Wali (1999) observed that the economic development of a country depends on agriculture and the knowledge released to farmers by researchers and agriculturist. He further pointed out that the role of ICT assumes great importance with proper integration with agriculture. The author stated that this will help solve the problems of food crisis and more agriculture towards a sustainable production. He further explained that ICT worked in collaboration with rural agricultural production in areas like Global information system, rural networking, geographical information system, agro meteorology and biotechnology.

It has been established that in Nigeria, rural dwellers constitutes more than 70 % of the total population, about the same percentage are illiterates that use crude farm equipments and resides in rural areas. Indeed, food, fibres and raw materials need of the entire populace are procured from the rural areas. Studies have shown that agricultural development in most developing countries has been hampered by low level of agricultural information exchange. According to Spore (1994), the major constraint to agriculture

development in rural areas and research in African Caribbean and pacific countries are the limited areas to current and relevant information in the form of primary document and machine readable database. It has also been established that rural farmers has no access to information and communication technology that can provide them with useful information to improve on their farming practices for maximum agricultural production, hence they are faced with problems of low productivity, food insecurity and poor nutrition (ziyp, 1994). Developing nation like Nigeria where peasants dominates in agricultural productivity suffers low rate of technology adoption and transfer due to lack of ICT and its usefulness in agriculture. An average farmer in Nigeria has little or no idea of how agricultural information can be generated from internet, electric mails, etc. Farmers may not be aware of the various areas in agricultural productivity. Information and Communication Technology knowledge and application in agricultural production has been a limiting factor to the development of rural agriculture in Nigeria and Imo State in particular.

It is against this background that this study appraised the application of ICT in rural agricultural production in Imo State with the view to improving farmer knowledge for better productivity and food security.

Specific objectives were to:

Determine the roles of ICT in rural agricultural production;

Determine measures for enhancing application of ICT to rural agricultural production;

Ascertain constraints to the application of ICT in rural agricultural Production.

The following hypotheses were postulated:

There is no significant difference in the mean ratings of contact farmers and extension workers on the role of application of ICT in rural agricultural production.

There is no significant difference in the mean ratings of contact farmers and extension workers on measures for enhancing application of ICT in rural agricultural production.

There is no significant difference in the mean ratings of contact farmers and extension workers on constraints to the application of ICT in rural agricultural production.

Materials and Methods

Imo State was the study area and comprised of three agricultural zones (Okigwe, Orlu and Owerri). The state is located in the Southeastern area of Nigeria and lies between latitude $5^0 45^1$N and $6^0 35^1$N of the equator and longitudes $6^0 35^1$E and $7^0 28^1$E of the Greenwich Meridian (Microsoft corporation, 2010). It has an annual temperature of 28 ^{0}C, and average annual relative humidity of 80 %, average annual rainfall of 1800-2500mm and an altitude of about 100m above sea level (Imo ADP, 2010).

The target population was 1,582, which comprised of both the contact farmers (C.F) and extension workers (E.W.) in the state. A proportionate sampling technique was adopted to select 648 C.Fs and 143 EWs. Fifty percent of each group were randomly sampled for the study. This is in line with Wali (1999) who opined that no fixed number and percentage is ideal, rather it is the circumstances of the study situation that determine the number or percentage of the population studied. Structured questionnaire was used to collect primary data which was subjected to analysis using mean scores, standard deviation and t-test. The hypotheses were tested at 5 % level of significance using t-test. Mean value of 2.5 to 4.00 signifies agreement while 0.5 to 2.49 was interpreted to mean disagreement.

Results and Discussion

Table 1 is on role of ICT in rural agricultural production. Results showed that all the items have their mean range from 2.5 to 4.00 indicating means above cut off point of 2.5. This implies that ICT plays significant role in the transformation of rural society with scientific knowledge for carrying out agricultural production. The hypothesis of no significant difference in the mean ratings of respondents was tested using t-test. Results reveals that 10items (1, 2, 3, 4, 5, 6, 7, 8, 9, 13) have calculated t-value less than the t-tabulated value of 1.96, indicating no significant difference in the mean responses of contact farmers and extension workers on the role of ICT in rural agricultural production. On the other hand, 3 items (3, 11 and 12) have calculated t-value greater than t-tabulated, indicating significant difference in the mean responses of the two groups of respondents thereby rejecting the hypothesis. GOI (2001), FAO (2003), Farrel (1999), Gerard (2003) and Ziyp (1994) in their findings agreed that ICT has played significant role in rural agricultural production. According to GOI (2001), ICT is an important means of achieving the necessity of developing the capacity to generate, absorb and disseminate agricultural information to rural farmers. In the same vein, FAO (2003) said it plays the role as a tool for providing local farming communities scientific knowledge for carrying out agricultural production. Commenting on farm production, Farrel (1999) pointed out that farmers could promote their products and handle simple transactions over the website while payment transactions can be handled off-line. Gerard (2003) posited that improved communication systems can help rural communities assess relevant and timely information on agriculture and rural development issues. Ziyp (1994) gathered that ICT plays important role in enabling extension workers to gather, store, retrieve and disseminate a broad range of information needed by farmers thus transferring them from extension workers into knowledge workers.

Table 1: Mean and t-test analysis of the responses of the respondents on the Roles of ICT in Rural Agricultural production.

S/N	The roles of ICT include:	X_1	$\overline{SD}_1$	X_2	SD_2	GX	t-Cal	Rm
1.	Transformation of rural society into information aware society 2.88	1.09	2.81	1.08	2.86*	0.70	NS	
2.	Provide local communities with scientific knowledge for carrying out agricultural production	2.87	1.02	2.83	1.07	2.85*	0.42	NS
3.	Provide means of communication	3.06	0.96	2.78	1.10	2.28*	3.07	NS
4.	Bridge digital divide between the urban and rural areas through computer training.	2.78	1.12	2.76	1.08	2.77*	0.21	NS
5.	Enable agricultural workers to gather, store, retrieve and disseminate broad range of information.	2.77	1.12	2.87	1.05	2.87*	1.20	NS
6.	help agricultural extension service to be more diversified and effective in meeting rural farmers information needs.	2.73	1.07	2.87	1.08	2.95*	1.40	NS
7.	Information and knowledge sharing in agriculture is made possible.	2.81	1.12	2.84	1.06	2.84*	0.30	NS
8.	help rural farming communities to access relevant information timely. 2.85	0.88	2.76	1.07	2.75*	1.07	NS	
9.	Facilitating decision making process in rural areas.	2.67	1.07	2.70	1.03	2.69*	0.05	NS
10.	Empowering rural communities	2.69	0.98	2.65	1.10	2.65*	0.80	NS
11.	Can be needed to target marginalized groups in the rural society, e.g. women and children	2.87	1.06	2.65	1.07	2.61*	2.26	S
12.	ICT enhance opportunities for market outlook and simple transaction can be handled through the web. 2.95	0.99	2.65	1.09	2.70*	3.26	S	
13.	Creating employment at the rural telecentres	3.08	0.97	2.72	1.08	2.79*	0.9	NS

G$\overline{X}$ = Grand Mean, SD = Standard Deviation, t-Cal = t-calculated, t-tab = t-table = 1.96, S = Significant, NS = not Significant, df = degree of freedom = 791, * = Agree, ** = Disagree, X = mean.

Results in Table 2 showed the measures for enhancing application of ICT to rural agricultural production. Data as presented revealed that all the 12 items have their mean range of 2.5 – 4.00 indicating means rated above the cut-off point of 2.5 on the rating scale. This implied that all the twelve items are ways ICT in rural agricultural production can be enhanced to increase farmer productivity. This is in line with the findings of FAO (1998) and Anderson (1999). The FAO (1998) noted that government of various development agencies in agriculture could play a key role in creating awareness of the power of appropriate traditional and new ICTs in facilitating rural agricultural development, and this could be done through workshops, radio, video and television. Anderson (1999) observed that some tools and methodologies such as participating communication appraisal have already been developed and have been used to uncover local skills and knowledge and to fully understand the information and knowledge needs of rural communities.

Table 2: Mean and t-test Analysis of the responses of the respondents on the Constraints to the Application of ICT in Rural Agricultural production

S/N The roles of ICT include:	X_1	SD_1	X_2	SD_2	GX	t-Cal	Rm
1. Lack of training for the operation of ICT gadgets	2.85	1.08	2.85	1.05	2.85	2.33	S
2. The use of computer is necessary but costly to purchase and maintain.	3.01	0.98	2.80	1.06	2.84	2.33	S
3. Poor attitude of farmers in the adoption of ICT in rural communities	2.76	1.02	2.81	1.06	2.80	1.53	NS
4. Insufficient telecommunication networks	2.68	1.09	2.75	1.08	2.74	0.70	NS
5. Lack of basic infrastructure like electricity in rural areas.	2.99	0.92	2.76	1.10	2.81	2.61	S
6. High level of illiteracy in rural Areas	2.87	0.91	2.69	1.11	2.72	1.50	NS
7. Gender insensitivity	3.13	0.78	2.47	1.05	2.62	4.69	S
8. Lack of policies and strategies that facilitate the harnessing of new ICT for rural development	2.98	1.00	2.67	1.09	2.73	3.16	S
9. Lack of local content and language barrier	2.88	0.96	2.66	1.09	2.69	2.44	S
10. Fear of project sustainability	2.90	1.02	2.61	1.09	2.69	3.08	S

$\overline{X}$ = Mean, SD = Standard deviation, t-cal = t-calculated,
t-tab = t-table – 1.96, df = degree of freedom = 791, S = significant
NS = not significant, level of significance = 0.5.

Results in Table 3 showed constraints to applicant of ICT to rural agricultural production. Data presented revealed that all the ten items on the constraints to application of ICT to rural agricultural production have their mean range from 2.5 to 4.0. This indicates that all the means are above the cut-off point of 2.5 which therefore shows that lack of training, high cost of computer, poor attitude of farmers and lack of basic infrastructure hinders effective application of ICT. Others include high level of illiteracy, fear of project sustainability and lack of policies and strategies that facilitate the harnessing of ICT for rural development. The hypothesis of no significant difference in the mean rating of the responses of the contact farmers and the extension workers on the constraints to the application of ICT in rural agricultural production was tested using t-test. Analysis reveals that three (3, 4 and 6) out of the ten items have t-tabulated value of 1.96, indicating no significant difference in the mean responses of contact farmers and extension workers on the constraints to the application of ICT in rural agricultural production for the three items. Applying t-test analysis also, data on items 1, 2, 5, 7, 8, 9 and 10 indicates significance difference in the mean responses of the two groups on the constraints to the application of ICT in rural agricultural production. This implies that lack of training, high cost of computer, lack of basic infrastructure, gender insensitivity and fear of project sustainability are major constraints to the application of ICT in rural agricultural production. These finding are in tandem with many related articles, reports and literature of Okwor (2002) and Mansell (1998). According to Mansell (1998), illiteracy is a fundamental barrier to participate in knowledge societies, of large number of rural farmers are illiterates. Okwor (2002) posited that in town and cities which have electricity, power supply is very unreliable and inadequate.

Table 3: Mean and t-test analysis of the responses of the respondents on the measures for enhancing application of ICT in rural agricultural production.

S/N The roles of ICT include:	$\overline{X}_1$	SD_1	$\overline{X}_2$	SD_2	$\overline{GX}$	t-Cal	Rm
1. Training and retraining of extension staff through workshops.	2.72	1.10	2.64	1.13	2.69	0.80	NS
2. Establishment of telecenters	2.81	1.11	2.78	1.09	2.82	0.30	NS
3. Develop standard for managing information	2.80	1.08	2.64	1.06	2.75	1.63	NS
4. Eradication of illiteracy among rural farmers.	2.88	1.04	2.60	1.09	2.74	2.08	S
5. provision of basic amenities by government to rural areas, e.g. electricity	2.70	1.03	2.75	1.08	2.81	0.52	NS
6. Lower consumer price and cheaper imports of ICT's hardware	2.82	0.95	2.76	1.05	2.77	0.65	NS
7. Remove trade barriers and reduce tariffs	2.86	0.92	2.68	1.10	2.70	2.06	S
8. Research institutes NGO's extension administrators should be actively involved in dissemination of agricultural information to farmers	2.80	1.06	2.65	1.08	2.69	1.54	NS
9. Creating farmers' awareness of ICT through participatory communication appraisal	3.09	0.98	2.79	1.06	2.84	3.29	S
10. Establishment of legal policy framework to back up ICT project in rural up ICT project in rural areas	2.92	1.01	2.74	1.05	2.78	1.93	NS
11. Repackaging of local content development	3.04	1.02	2.50	1.05	2.67	5.44	S
12. promoting use of a mix of traditional and modern ICTs.	2.90	0.92	2.66	1.08	2.74	2.75	NS

$\overline{X}$ = Mean, SD = Standard deviation, t-cal = t-calculated,
t-tab = t=table – 1.96, df = degree of freedom = 791, S = Significant
NS = Not significant, level of significance = 0.5,* = Agree, ** = Disagree.

Conclusion

Information and Communication Technology have been found to play important roles of disseminating relevant agricultural information to farmers timely through extension workers. But the application of ICT to rural agricultural production are inhibited by several factors which includes lack of basic infrastructures in the rural areas, high level of illiteracy, high cost of computer, lack/inadequate training for the operation of ICT gadgets and poor attitude of farmers in the adoption of ICT in rural communities. However, ICT application to rural agricultural production could been enhanced through training and retraining of extension staff, provision of basic amenities to rural areas, eradication of illiteracy, etc.

References

Anderson, Jon (1999). Applying the lessons of participatory Communication and Training of Rural Telecentres, FAO, Rome, Italy, 5pp.

(FAO) Food and Agricultural Organization (1998). Knowledge and Information for food Security in Africa; from traditional media to the internet. Communication for development group, extension education and communication.
Services (SDRE)., FAO Research and Traianing Division, Rome, Italy. 22pp.

(FAO) Food and Agricultural Organization (2003). ICT and Biotechnology. Retrieved 11 January, 2005 from: http:ictupdate.cta.int.

Farrel (1999). The Internet and Rural development recommendations for strategy and activity-Final report, Rome. Retrieved 30 October, 2004 from; http://www.fao.org/sd-dimensions/htm.

Gerard, B. (2003). The one to watch; Radio, new ICTs and Interactivity. Food and Agricultural organization of the United Nations, Rome.

GOI (2001). "Report of prime Ministers tasks force on India as knowledge Superpower" planning Commission, Government of India, new Delhi.

Imo ADP (2010). Work Programme Bulletin Imo State Agricultural development Programme, Owerri.

Microsoft Corporation (2010). Microsoft Encarta Premium Suite 2010 (software)

Mansell, R. (1998). Knowledge societies information technology for sustainable development. United Nations Commission on Science and technology for development. Oxford University press, new York, USA: 1-35.

Okwor, F.A. (2002). Science and technology Issue for education in the Information age. Interdisciplinary Education Journal (WTEJ). Pp 35.

Reineche, J. (1994) "Welcome address of International Symposium on new information technologies in agriculture: paper presented on Nov. 10-12,

Bonu, Germany". Quantity Bulletin of the International Association of agricultural information specialists 39, Nos. ½ p.5.

Spore (1994), CTA's Selective dissemination of information services. CTA publication, Wageningen, Netherlands No 69.

Wali, J. (1999). Distance Education for Agriculture and rural development: The Third ware. Distance education for Agriculture and Rural development, AERRD.

Ziyp, W. (1994). Improving the transfer and use of agricultural information a guide to information technology Washington, DC, World Bank discussion paper No. 247.