International Journal of Education and Development using Information and Communication Technology (IJEDICT), 2007, Vol. 3, Issue 1, pp. 85-93.

Awareness, access and usage of information and communication technologies between female researchers and extensionists

E.L. Adebayo
Federal University of Technology, Akure, Nigeria

O.M. Adesope
University of Portharcourt, Portharcourt, Nigeria

ABSTRACT

Information and communications technology (ICT) has become a very important feature in the Nigerian agricultural sector in contemporary times. Even though it is still a new concept, an increasing number of professionals are appreciating its use for development work. Female researchers and extensionists are important stakeholders in the development of agriculture in Nigeria. They are important because they are required to provide support to the female farmers who ordinarily would be more comfortable with female researchers. It is therefore pertinent that female researchers and extensionists be abreast with modern information and communication technologies so as to discharge their duties more effectively. This study examines awareness, access and utilization of ICT among female researchers and female extensionists. Data was obtained from 106 female researchers and 27 female extensionists in SouthEastern Nigeria, with the aid of a questionnaire. Information collected showed that female researchers and female extensionists are aware of ICT; both categories of respondents know how to access Internet on their own. Respondents do not have adequate access to IT. Also, 55.7 and 70.4 per cent of female researchers and female extensionists respectively used ICT for between 3 to 5 times a week. The types of ICT needed by female researchers and female extensionists include; World Wide Web, Electronic Mail, Electronic Spreadsheet, Word Processing, CD-ROM, Use of Projector, Use of computer, Web Design, Chatroom.

Key words: *Awareness, access, utilization, ICT, female researchers, female extensionists*

INTRODUCTION

Information and Communication Technology (ICT) is the scientific, technological and engineering disciplines and the management technologies used in the handling of information, processing and application related to computers. It is also concerned with the interactions with man and machines; and associated socio-economic and cultural matters (UNESCO in Osuagwu, 2001). Information Technology according to Marshall, (1984) in Madu (2000) is the coming together of computing and telecommunications for the purpose of handling information. ICT is also defined as the term used to describe the tools and processes to access, retrieve, store, organize, manipulate, produce, present and exchange information by electronic and other automated means. These include hardware, software and telecommunications in the forms of personal computers, scanners, digital cameras, handhelds/PDAs, phones, faxes, modems, CD and DVD players and recorders, digitalized video, radio and TV and programs like database systems and multimedia applications (http://www.unescobkk.org/index.php?id=1013. The bottom-line is that information technology is all applications that are computer-based for the purpose of sharing ideas, data, and other relevant information for the improvement of the statusquo. According to CTA (2003) Information and Communication Technologies are technologies which facilitate communication and thus the processing and transmission of information electronically. The use of

ICT in agricultural extension and rural development is significant especially now that its use has witnessed an upsurge in almost all areas of rural life in several African countries where it has provided a medium to adequate access to agricultural information, despite the persisting problems of access, connectivity, literacy, content and costs (CTA, 2003). In this respect, Omotayo (2005) observed that agricultural extension depends largely on information exchange between and among farmers and a broad range of other actors. Frontline extension workers who are the direct link between farmers and other actors in the agricultural knowledge and information system (AKIS), are well positioned to make use of ICT to access expert knowledge or other types of information that could facilitate the accomplishment of their routine activities.

Modern agricultural extension system encourages the development of positive attitude in the scientists to appreciate the knowledge, experience and capacities of the local people in the research development process (Amalu, 1998). ICT (ICT) is a means to this end. ICT as an extension tool will enhance flow of information in the application of agricultural extension services Arokoyo (2005) reported that to date, the radio and television have been the major ICTs used in agricultural extension delivery in Nigeria. Despite the importance of these channels, they are principally owned and controlled by government. This means that only programmes that are government-owned and government-based are featured. The information content of these channels is more provider-driven than user-driven and this has serious implications for extension delivery.

Although most of the organizations in the National Agricultural Research and Extension System (NARES) now have computers for information and data management, most of the computers have neither telephone nor internet access. (Arokoyo, 2005). Consequently, a substantial number of research institutes and Extension organizations have no Email contacts.

If modern ICT facilities are not adequately built into the mainstream of Nigerian agricultural system, there is likely to be stagnation in the dissemination, utilization and application of scientific agricultural information for purposeful development of the system. Meera et al (2004) had noted that as a result of the emerging new paradigm of agricultural development, old ways of delivering important services to citizens are being challenged; traditional societies are also being transformed into knowledge societies all over the world. ICT has been a tool for achieving meaningful societal transformation. This transformation is a function of reliable agricultural research network. A network is a group of individuals or institutions linked together because of commitment to collaborate in solving a common agricultural problem(s) and to use existing resources more effectively. The use of computers enhance research network in various ways which are facilitated through communication technologies like electronic mail, electronic conferencing, etc. Through these means scientists, administrators and information personnel are provided with rapid and reliable communication while increasing productivity and decreasing communication costs by reducing the physical means of communication channels (Kerrigan, Lindsey and Novak, 1994).

The use of computers by extensionists has been noted as a crucial part of extension development (Martin, et al 2001). Goode and Elliot (1992) quoted Douce (1979) and Prawl et al (1984) as insisting that for contemporary extension to provide viable educational programmes and opportunities to expanded audiences, the use of new electronic technology, including computers is inevitable. Elliot (1985) classified extension applications of computers into two general categories to include office management uses and educational uses. The educational uses take care of clientele services which is a prerogative of agricultural extension delivery. Astroth (1990) advised that we need to adopt technologies that will enhance our delivery system. According to him, at a minimum we need administrators who will foster on institutional culture with a strong commitment to advanced communications technology. Female professionals fit this description.

Over the years the importance of females to the development of agriculture has been emphasized. They are major stakeholders in food security provision. But in the very conservative settings it is difficult for extension service delivery to reach these women. However, it is only when the female scientists are aware of, have access to, and can use modern ICTs that they can effectively discharge their communication functions. This is because females are almost always not available to reach them because they can empathize more with them. This study therefore examines the level of awareness, access and utilization of ICT among female researchers and extensionists. These two categories of professionals are concerned with agricultural information that will eventually be utilized by relevant clienteles in the long run. The study also determined the types of ICTs needed by respondents for their work.

METHODOLOGY

The study area is South-eastern Nigeria which is made up of five States namely Imo, Abia, Enugu, Ebonyi, Anambra States. Two States namely Abia and Imo were randomly selected for the study. Five organizations were used as sampling frame; Agricultural Development Programmes (ADPs), Universities, colleges of Agriculture, Non Governmental Organizations and research institutes. For the purpose of this study, respondents from the ADPs and NGOs were categorized as extensionists because their mandate borders more on facilitating change to farmers, while respondents from Universities, Research institutes and Colleges of Agriculture/Technology were categorized as researchers because research activities are more pronounced than extension services.

In Imo State, out of 107 respondents identified, 74 were randomly selected made up of 59 researchers, (which cut across Federal University of Technology (33), Imo State University (14), Michael Okpara College of Agriculture and Technology (9), Nigeria Institute of Horticulture(3); and 15 extensionists which cut across the Agricultural Development Programmes (9) and two Non-Governmental Organizations (6). In Abia State, out of 91 respondents identified, 65 were randomly selected made up of 47 researchers, (which cut across Michael Okpara University of Agriculture (20), Abia State University (12), Forestry Research Institute (5), National Root Crops Research Institute(10); and 18 extensionists, (which cut across the Agricultural Development Programme (12) and Non Government Organization (6). In all, 139 respondents were identified with the help of senior extension personnel, heads of units and a list of respondents generated from where the sample was drawn and used for the study, but data was available for 133 respondents made up of 106 researchers and 27 extensionists.

Data collection and analysis

The instrument for data collection was a questionnaire which elicited information on personal characteristics of respondents, awareness, access and utilization of ICT and types of ICT needed. The study lasted for 5 months from May to September. The Statistical Package for the Social Sciences (SPSS version 11) was the computer software used for data analysis. The statistical tools used for the study include; frequencies, percentages, means

RESULTS AND DISCUSSION

Personal characteristics of female researchers and female extensionists

Table 1: *Personal characteristics of respondents*

Variables	Female Researchers	Female Extensionists
Marital Status	**(n = 106)**	**(n=27)**
Single	28(26.4)	8(29.6)
Married	78 (73.6)	19(70.4)
Age		
29-34	15(14.2)	27(100.0)
35-40	62 (58.5)	-
41-47	29(27.4)	-
Working experience		
3-8	94(88.7)	27(100.00)
9-13	12(11.3)	-
Academic qualification		
HND/BSC	-	11(40.7)
MSc	95(89.6)	16(57.3)
PhD	11(10.4)S	-
Category		
Educational	54(50.9)	10(37.0)
ADP	2.3(21.7)	11(41.0)
Research Institution	21(19.8)	3(11.0)
Non Governmental Organization	8(7.5)	3(11.0)
Hours spent on ICT (weekly)		
0 - 4	59 (55.7)	8 (29.6)
5 - 8	47 (44.3)	19 (70.3)
ICT skill rating		
0-1	66(62.3)	-
2-3	40(37.7)	27(100.0)
Length of Exposure to ICT (years)		
2-5	73(68.9)	19(70.4)
6-9	16(15.1)	8(29.6)
9-11	17(16.0)	-
Distance of ICT facility from office (km)		
0 -11.5	20 (18.9)	11 (41.0)
12 - 23	86 (81.1)	16 (59.0)

Source: Field Survey data, 2005

Table 1 shows that 73.6 percent of the female researchers are married while 70.4 percent of the female extensionists are married. The findings showed that 58.5 percent of the female researchers are between 35 and 40 years old, with mean age of 38 years while 100% of the female extensionists are between 29 and 34 years old, with mean age of 31 years old. It is obvious that female researchers were relatively older than female extensionists. The study also reveals that 88.7 percent of the female researchers reported that they have work experience of between 3 and 8 years, with average working experience of 6 years, while 100 percent of the female extensionists reported work experience of between 3 and 8 years, with mean work

experience of 4 years suggesting that female researchers had relatively higher working experience than female extensionists. Findings further showed 89.6 percent of the female researchers had MSc as highest academic qualification, while 57.3 percent of the female extensionists reported having MSc. The findings revealed that 50.9 percent of female researchers belong to educational institutions (universities, colleges of Agriculture/Technology, and Research Institutes). However, 41 percent of the female extensionists belong to the Agricultural Development Programmes (ADP). The ADP is the major organ of agricultural extension in Nigeria, while some rural development NGOs also carry out extension work.

In order to determine if respondents were skilled in the use of ICT, they were requested to rate their skills themselves. Among the female researchers, information technology self-rating of between 0 and 1, with mean rating of 1.49, while ICT rating of female extensionists was between 2 and 3, with mean rating of 2.29. The implication of this finding is that female extensionists had higher mean ICT skill rating than female researchers. Female extensionists have been more receptive to ICT suggesting a moderate level of ICT skills.

Gregg and Irani (2004) reported average self-rating of ICT skills among Extension agents. This present study reveals that 68.9 percent and 70.4 percent of female researchers and female extensionists respectively have been exposed to ICT for between 2 and 5 years with mean years of exposure of 4.5 years. It is pertinent to note that ICT made significant entry into Nigeria around Year 2000. This obviously could have accounted to the few years of exposure. The findings of the study showed that 81 percent of female researchers and 59 percent of female extensionists travel for between 12 and 23 km to use ICT facility far away from their respective offices because their office computers are not connected to the Internet. This shows that female researchers and female extensionists obtain ICT services from Public cybercafés. Omotayo (2005) stated that Public cybercafés offer value-added services and are key instruments in telecommunication policy. Public cybercafes are common features in the study area hence respondents utilize the services easily.

Respondents' awareness, access and utilization of ICT

About 84 percent of the female researchers indicated that they are aware of ICT while 88.5 percent of female extensionists indicated that they were aware of ICT suggesting that a relatively higher percentage of female extensionists are aware of ICT. Also, about 82 percent of the female researchers indicated that they know how to access Internet on their own while 74.1 percent of female extensionists indicated that they know how to access Internet on their own. Whereas 71.7 percent of the female researchers indicated that they do not have adequate access to ICT, 59.3 percent of the female extensionists indicated that they have adequate access. The findings which showed that female researchers do not have adequate access to Information Technology is a clear indication of the dearth of computer and computer related facilities in their work environment. This is further compounded by inadequate seminars and workshops on the use of Information Technology as attested to by respondents.

The findings of the study showed that 60.4 percent and 59.3 percent of the female researchers and female extensionists respectively have no Personal Computers in their offices. Those who indicated that they have Personal Computers in their offices stated that they were not connected to the Internet. This is a serious situation that shows that there is still a lot to be done if the Nigerian agricultural sector must meet up the global challenges of ICT. When asked to indicate how frequent they used information technology in a week, 55.7 per cent and 70.4 per cent of female researchers and female extensionists respectively indicated 3 to 5 times a week. As expected female extensionists recorded a higher percentage compared to female researchers.

Table 2: *Awareness, access and utilization of ICT between female researchers and extensionists*

	Female Researchers	Female Extensionists
Awareness Yes No	89 (84.0) 17 (16.0)	22 (88.5) 5 (18.5)
Do you know how to access Internet on your own? Yes No	87 (82.1) 19 (17.9)	20 (74.1) 7 (25.9)
Do you have adequate access to ICT? Yes No	30 (28.3) 76 (71.7)	16 (59.3) 11 (40.7)
Do you have Personal Computer in your office? Yes No	42 (32.6) 64 (60.4)	11 (40.7) 16 (59.3)
Is it connected to the Internet? Yes No	17 (16.0) 89 (84.0)	4 (14.8) 23 (85.2)
Frequency of ICT use (number of times per week) 0-2 3-5	47(44.3) 59(55.7)	8(29.6) 19(70.4)

Source: Field survey data, 2005

Types of ICTs needed by respondents

Using an open ended question, the types of ICT needed by female researchers and female extensionists were found to include; World Wide Web, Electronic mail (Email), Electronic Spreadsheet, Word Processing, CD-ROM, Use of Projector, Use of computer, Web Design, Chatroom.

Table 3: *Types of ICT needed by respondents*

World Wide Web
Electronic Mail
Electronic Spreadsheet
Word Processing
CD-ROM
Use of Projector
Use of Computer
Training on Web Design
Chatroom

Source: Field survey data, 2005

Gregg and Irani (2004) reported the use of Email, Microsoft PowerPoint, World Wide Web, Spreadsheets, Web page editing and development. There is no doubt that Information and Communication Technologies such as email, www, etc., are required for effective agricultural extension. This is because they have potentials to reach larger audience; they are also effective for training that enhances capacity building of the end-users. Their usefulness in the search and packaging of information on demand and for exploring alternative production options and technologies have been reported (Arokoyo, 2005).

Differences in hours used on ICT between female researchers and female extensionists

Table 4 shows that female researchers spent an average of 3.5 hours on ICT, while female extensionists spent an average of 4.4 hours on ICT. The result reveals that female extensionists spend relatively higher number of hours on ICT compared to female researchers.

Table 4: *Z-test analysis showing differences in hours used on ICT between female researchers* and female extensionists

Category	N	Mean	SD	df	z-value
Researchers	106	3.528	2.458	131	1.758^{NS}
Extensionists	27	4.407	1.647		

Source: Computed from survey data, 2005

The Z-test analysis showed that there is no significant difference in the number of hours spent on using ICT weekly. The implication of this finding is that female researchers and female extensionists are not spending enough time on ICT. When compared to findings of Goode and Elliot (1992) who found in their study that extension personnel spent an average of six hours each week on IT, it is easy to conclude that female researchers and female extensionists in Southeastern Nigeria still need to spend adequate time on ICT to enable them increase their skills on the tools.

Differences in the distance from office of respondents and ICT facility

Table 5 shows that female researchers indicated the distance between their office and the ICT facility is an average of 13.99 km, while female extensionists indicated an average of 12.74km.

Table 5: *Z-test analysis showing differences in distance of ICT facility from the office of researchers and extensionists*

Category	N	Mean	SD	Df	Z-value
Researchers	106	13.991	8.194	131	0.452NS
Extensionists	27	12.741	5.088		

Source: Computed from survey data, 2005

The Z-value of 0.452 shows that there is no significant difference in the distance to ICT facility between office of female researchers and female extensionists. Respondents had indicated that they have computers in their offices but these are not connected to the Internet. The long distance indicated in this study is a manifestation of frustration experienced in using ICT tools among respondents. The frustration experienced are mainly because they have to interrupt their work schedule to get to a cybercafe and also because of the poor transport network. In addition they pay for the time used in the cybercafe.

CONCLUSION

The study investigated awareness, access and utilization of ICT between female researchers and female extensionists. Female scientists are significant stakeholders in the agricultural sector. The study identified that awareness of ICT among female researchers and female extensionists is high and found that respondents know how to access the Internet but reported inadequate access to ICT. Most respondents do not have computers in their offices and for those who indicated that they have personal computers in their offices reported that they are not connected to the Internet. It was found that majority of the respondents used ICT for between 3 and 5 times a week. The study found that female researchers spent an average of 3.5 hours on ICT weekly, while female extensionists spent 4.4 hours weekly. There was no significant difference in the number of hours spent on ICT weekly between female researchers and female extensionists. Also, it was found that the distance between ICT facility and office of female researchers is approximately 14km, while for the female extensionists a distance of approximately 13km was indicated. The types of ICT needed by female researchers and female extensionists include World Wide Web (www), Electronic mail (E-mail), Electronic spreadsheet (Microsoft Excel), word processing, compact Disk Read Only memory (CD ROM). Use of projector, use of computer, training on web design, chatroom, VCD and DVD.

RECOMMENDATIONS

Based on the findings of the study the following recommendations are hereby made:
Since a dearth of computers in offices of female researchers and female extensionists was identified, the need to equip offices with personal computers and link them up with the Internet is very important. This will reduce the stress of travelling for distance of 13-14 km to utilize ICT facilities. A situation where scientists go to public cafes to use ICT tools is saddening. The use of CD ROM, chatroom and Electronic spreadsheet should be given serious consideration in ICT applications among respondents. It is disappointing that many researchers and extensionists find it difficult to use these tools. This has serious implication for scientific agriculture in Nigeria as a whole.

Acknowledgement

We wish to express sincere appreciation to the World Summit on Information Society, Gender Caucus, Ottawa, Canada for providing the grants that supported this work.

REFERENCES

Adesope, O.M (2004) Information technology needs of agricultural extension managers and supervisors in the Niger delta area of Nigeria. *Unpublished PhD Thesis. Federal University of Technology, Owerri, Nigeria*.

Amalu, U. (1998) *Agricultural Research and Extension delivery systems in Sub-Saharan Africa.* Calabar: University of Calabar Press.

Arokoyo, T. (2005) ICTs application in Agricultural Extension service delivery. In: Adedoyin, S.F (ed) *Agricultural Extension in Nigeria.* Ilorin: Agricultural Extension Society of Nigeria.

Astroth, K.A (1990) Information Technology: Extension's future. *Journal of Extension, 28* (1), (spring) www.joe.org/joe/1990spring/f1.html.

Technical Centre for Agricultural and Rural Cooperation (CTA) (2003) *Spore*. Issue no. 99

Elliot, G.E. (1985) Microcomputers in cooperative Extension. *The Agricultural Education magazine.* LVII (10), 20-22.

Goode, D.Z and Elliot, G.E (1992) Who's responsible for Computer competence? *Journal of Extension,* 30 (4), (Winter) www.joe.org/joe/1992Winter/a6.html.

Gwary, M. M. (1988) Identification of skills and competencies needed by extension agents in Borno State. Unpublished MSc Thesis, University of Ibadan, Nigeria (http://www.unescobkk.org/index.php?id=1013

Kerrigan, K; Lindsey, G. and Novak, K. (1994) 'Computer networking in International. Agricultural Research Experience of the CGNET. New Information technologies in Agriculture'. *Quarterly bulletin of the International Association of Agricultural Information Specialists,* XXXIX, (1&2), 182-193.

Madu, E.C. and Adeniran, T.N. (2000) *Information technology uses and preservation of resources in libraries and information centers.* Oyo: Odumatt press and publishers.

Martin, B.L , Stewart, D.L and Hillison, J (2001) Computer anxiety levels of Virginia Extension personnel. *Journal of Extension,* 39 (1), www.joe.org/joe/2001february/a1.html.

Meera, S. N., Jhamtani, A., and Rao, D. U. M. (2004) 'Information and communication technology in Agricultural development: a comparative analysis of three projects from India'. *Agricultural Research and Extension Network. Network Paper No. 135, 13pp*

Omotayo, O.M. (2005) ICT and agricultural extension. Emerging issues in transferring agricultural technology in developing countries. In: Adedoyin, S.F (ed) *Agricultural Extension in Nigeria.* Ilorin: Agricultural Extension Society of Nigeria.

Osuagwu, D. E. (2001) 'New technologies and services in internet business'. *Journal of Professional administration, July - Sept, 29-41.*

Richardson, D. (2003) Agricultural extension transforming ICTs. Championing universal access. *Background papers for CTAs ICT observatory*.

Tiamiyu, M. A. (2001) Information Technology for transforming the visions and efficiency of Nigerian Public agents. *Working paper 37*. Development Policy Centre, Ibadan, Nigeria

Truitt, G.A.(1998) Female agricultural extension agents in El Salvador and Honduras: do they have an impact? *Training for agricultural and rural development 1997-98*. FAO, Rome.

Copyright for articles published in this journal is retained by the authors, with first publication rights granted to the journal. By virtue of their appearance in this open access journal, articles are free to use, with proper attribution, in educational and other non-commercial settings.

Original article at: http://ijedict.dec.uwi.edu//viewarticle.php?id=282&layout=html