



**AgEcon** SEARCH  
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

*The World's Largest Open Access Agricultural & Applied Economics Digital Library*

**This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.**

**Help ensure our sustainability.**

Give to AgEcon Search

AgEcon Search

<http://ageconsearch.umn.edu>

[aesearch@umn.edu](mailto:aesearch@umn.edu)

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*



**TECHNICAL, ORGANISATIONAL AND REGULATORY CONSTRAINTS TO THE USE OF INFORMATION COMMUNICATION TECHNOLOGIES (ICTS) INFRASTRUCTURE FOR AGRICULTURAL EXTENSION DELIVERY IN EDO STATE, NIGERIA**

**Olajide, B. R. and E. C. Uwaya**

Department of Agricultural Extension and Rural Development, University of Ibadan, Ibadan, Nigeria

E-mail: r.olajide@gmail.com

**ABSTRACT**

*In spite of the substantial leap in ICT infrastructural development in Nigeria, certain constraints still limit the potentials of ICTs for information dissemination. This study investigated constraints to the use of ICTs for agricultural information dissemination in Edo state, Nigeria. A multi-stage sampling technique was used to select 116 extension workers; while primary data were collected with the use of structured questionnaire. Data were analysed using both descriptive (frequencies and percentages) and inferential (Chi square and PPMC) statistics at  $p = 0.05$ . Results indicate that most extension workers were male (67.2%) with Diploma qualification (74.1%), with vast professional experience ranging from 11-20 years (65.4%) and being ICT literate (51.7%). Available ICT tools for information dissemination were radio (83.6%), mobile telephony (86.2%) and use of short message services (81.0%). While network fluctuation (42.2%) and lack of expertise on the part of the extension workers (51.7%) were fingered as technical constraints, organisational constraints identified as impeding ICT use included insufficient computer training for extension personnel (41.4%) and poor funding for ICTs in extension organisations (33.6%). Inadequate regulatory environment (48.3%) and strategic vision in developing ICT for rural areas (63.8%) were identified as regulatory constraints for ICTs use for agricultural information dissemination. There was a significant relationship between use of ICT for agricultural information dissemination and availability of ICT ( $r=0.877$ ) as well as constraints ( $\chi^2=26.9$ ). It is recommended that ICT infrastructure be provided in extension organisations while all technical and regulatory issues be resolved to take full advantage of opportunities ICTs offer.*

**Keywords: ICT infrastructure, ICT access, Regulatory constraint**

**INTRODUCTION**

Extension delivery is a process and medium of disseminating information from the research centre to the farmers' door step via the extension agents. It is a process of transfer of technology from the point of formulation to the receiving clientele whom the information are intended for. Information and Communication Technologies (ICTs) are technologies that facilitate communication, as well as processing and transmission of information by electronic means. They encompass the full range of ICTs from radio and television to telephone, computers and the internet (CTA, 2003). It could

also be viewed as electronic devices for capturing, processing, storing and communicating information (Arokoyo, 2011).

The potential applications of ICTs in extension delivery are not far fetched as it has been foreseen as an enhancer of farmer's ability to collate demand, collaborate for learning, an exchange for time sensitive information in market prices and diseases outbreak. It is also a maker of efficient extension systems and structures, an engager of farmers in assessing their own needs and solution, a facilitator of multi-stakeholders brainstorming, among others (Arokoyo, 2011).

Lawal-Adebowale (2009) and Agbamu (2006) posit that different tools and media of ICTs could be employed to ensure an effective extension delivery. Lawal-Adebowale (2009) buttresses that, appropriate application and integration of ICTs in which people are expected to adapt the communication technologies to fit the need or purpose at hand should be embarked upon in order to achieve meaningful impact in agricultural development through ICT application. This, according to him, would contribute to reducing the digital divide (including rural-urban, wealth and gender divide) at individual, group and community levels; give a voice to the voiceless; foster and facilitate community decision- making and action; as well as advance community ownership of ICT.

Arokoyo (2010) opines that the major constraints to the use of ICTs have to do with poor ICTs infrastructures, low level of ICT literacy (not only of rural people but among extension workers), irregular power supply and cost. Arokoyo (2011) unveils other constraints as low level capabilities of gateways and portals to international networks/satellite system; limited and very high cost of telephone services; limited access to computer or internet; lack of communication policy by government; high level of rural poverty and policy inconsistencies. These have the potency to deter effective extension delivery using ICTs. Idu and Obinne (2009) states ICT constraints as poor connections, insufficient telephone lines and illiteracy, local resourcefulness and inventiveness. Oluwatayo and Ahmed (2007) unravel the constraints of female folk in the use of ICTs as: low socio-economic status, lack of training and literacy; lack of autonomy, lack of time and social influence. Even with the establishment of Technical Centre for Agriculture and Rural Cooperation (CTA) - supported question and answer service in Nigeria, anchored by National Agricultural Extension and

Research Liaison Services (NAERLS) with collaborating institutions, it is no gainsaying that state-wide ADPs' extension workers are not taking full advantage of these privileges. Most constraints enumerated above have been implicated. This suggests that in spite of the quantum leap in ICT infrastructural development in Nigeria, certain constraints still limit the potentials of ICTs for agricultural extension delivery. Hence this study investigated available ICT tool for extension delivery as well as technical, organisational and regulatory constraints to the use of available Information Communication Technologies (ICTs) infrastructure for agricultural extension delivery in Edo state, Nigeria.

#### **METHODOLOGY**

The study was carried out in Edo state of Nigeria. The population of the study comprised of all Extension Workers (EWs) in the state's Agricultural Development Programmes (ADPs). In all, there were 205 extension workers in Edo state's Agricultural Development Programme. About 60% of the EWs in the state were randomly selected, hence, a total of 123 EWs were selected for the purpose of this study. However, only 116 returned useful questionnaires for the purpose of data analysis.

Some variables measured included available ICTs tools for extension delivery, technical, organisational and regulatory constraints confronting the use of ICTs for extension delivery in the state. Respondents were presented with list of constraints in the use of ICT tools for their work and were asked to rate each of the constraints as very serious, serious, mild and not a constraint. On the use of ICT tools for extension delivery (dependent variable), respondents were presented with fifteen (15) ICT tools and were asked to indicate the extent to which the ICT tools are used

for extension delivery on a four points Thurston-type scale of Often Used, Minimally Used, Seldom Used or Not Used and were scored as 3, 2, 1, and 0 respectively. Data were analyzed using descriptive (frequency counts) and inferential statistics (Chi-square and PPMC) at 0.05 level of significance.

## RESULTS

### Extension workers' personal characteristics

Available statistics in Table 1 indicate that more than one third (36.2%) of the extension workers were in the age bracket of 36-45 years and close to half (45.7%) were 46-55 years in the study area. Male extension workers were more (67.2%) than their female (32.8%) counterpart. This confirms the position of Salawu and Saingbe (2008) and Olajide and Amuzat (2013) that specialized agricultural profession involves more males than females. Larger proportion (74.1%) of the extension workers were working with Ordinary National Diploma while only 21.6% and 3.4% had Higher Diploma and a first degree respectively. This implies that extension work in the study area is still largely in the hands of averagely educated professionals that may not be well grounded in the principle of extension work. However, what the extension workers in the study area lacked in professional qualifications was compensated for in the number of years of professional experience. More than two-third (82.8%) of the extension workers had between 11 and 25 years of working experience. On computer literacy, more than half of the respondents (51.7%) were computer literate and they actually possessed IT certificate. This implies that these set of extension workers purposely went for IT training.

**Table 1: Distribution of respondents based on their personal characteristics**

Variable	Frequency	Percent
<b>Age Group</b>		
26-35	17	14.7
36-45	53	45.7
46-55	42	36.2
>55	4	3.4
<b>Sex</b>		
Male	78	67.2
Female	38	32.8
<b>Family Size</b>		
1-3	15	12.9
4-6	70	60.3
7-9	25	21.6
10-12	6	5.2
<b>Educational attainment</b>		
OND	86	74.1
HND	25	21.6
B.Sc	4	3.4
M.Sc	1	0.9
<b>Years of working experience</b>		
6-10	14	12.1
11-15	39	33.6
16-20	38	32.7
21-25	19	16.4
26-30	5	4.3
31-34	1	0.9
<b>Computer Literacy</b>		
Yes	63	51.7
No	56	48.3
<b>IT Certificate</b>		
Yes	63	51.7
No	56	48.3

### Availability of ICT tools for extension delivery

Table 2 presents the available ICT tools in the extension systems in the study area. From the data, it is evident that new ICT tools like mobile telephone (86.2%) and associated tool like the Short Message Services (SMS) (81.6%) were largely available, while radio (83.6%) stood out among old ICTs available for extension delivery in the study area. The general feeling one gets from these data is that in spite of abundance of several ICT facilities and tools available to drive extension delivery, little of these are being exploited in the study area. The popularity of Global System of Mobile (GSM) communication tools in the area might not be unconnected with its recent use in the

e-wallet of the Agricultural Transformation Agenda of the present government. This is corroborated by Olajide (2013) who reported massive proposition of media preference for GSM tools by cassava

farmers in the Sustainable Cassava Seed System (SCSS) project of the Catholic Relief Services in both Benue and Oyo states.

**Table 2: Availability of ICT tools for extension delivery by Extension Workers in Edo state**

Available ICT Tools	Available	Not Available
Radio	97 (83.6)*	19 (16.4)
Telephone (Fixed)	25 (21.6)	91 (78.4)
Telephone (Mobile)	100 (86.2)	16 (13.8)
Short Message Services (SMS)	94 (81.0)	22 (19.0)
Cameras	50 (43.1)	66 (56.9)
Video Machine	33 (28.4)	83 (71.6)
Computer (Desktop)	41 (35.3)	75 (64.7)
Contact Database and System	20 (17.2)	96 (82.8)
DVD	44 (37.9)	72 (62.1)
Internet	57 (49.1)	59 (50.9)
Fax	18 (15.5)	98 (84.5)
Newspaper	71 (61.2)	45 (38.8)
Ipod	10 (8.6)	106 (91.4)
Newsletter	33 (28.4)	83 (71.6)

Source: Field survey, 2012

\*Figures in parentheses are percentages

**Use of ICTs for extension delivery**

Available information on the use of ICTs for the purpose of extension work reveals a similar pattern as found in available ICTs for information dissemination. Table 3 indicates that while mobile telephone ( $\bar{x} = 1.88$ ) and SMS ( $\bar{x} = 1.78$ ) were mostly used new ICTs for extension delivery in the study area and radio was mostly used old ICTs ( $\bar{x} =$

2.07). Newspaper ( $\bar{x} = 1.61$ ) and newsletter ( $\bar{x} = 1.17$ ) were often used print media related ICTs. Reasons advanced for available ICTs above with respect to minimal exploitation of emerging ICT tools holds for this variable too. It can thus be concluded that extension work in the study area still predominantly rely on old ICTs (radio) for its delivery.

**Table 3: Use of ICTs for extension delivery by Extension workers in Edo state**

ICTs	Often	Minimal	Seldom	Not Used	Mean
Radio	48 (41.4)	37 (31.9)	23 (19.8)	8 (6.9)	2.07
Telephone (Fixed)	15 (12.9)	11 (9.5)	12 (10.3)	78 (67.2)	0.68
Telephone (Mobile)	19 (16.4)	76 (65.5)	9 (7.8)	12 (10.3)	1.88
Short Message Services (SMS)	15 (12.9)	73 (62.9)	15 (12.9)	13 (11.2)	1.78
Cameras	10 (8.6)	32 (27.6)	36 (31.0)	38 (32.8)	0.43
Video Machine	1 (0.9)	17 (14.7)	19 (16.4)	79 (68.1)	0.29
Computer (Desktop)	13 (11.2)	29 (25.0)	14 (12.1)	60 (51.7)	0.96
Contact Database and System	10 (8.6)	30 (25.9)	11 (9.5)	65 (56.0)	0.87
DVD	12 (10.3)	32 (27.6)	8 (6.9)	64 (55.2)	0.93
Internet	2 (1.7)	53 (45.7)	8 (6.9)	53 (45.7)	1.04
CD-ROM	10 (8.6)	49 (42.2)	4 (3.4)	53 (45.7)	1.14
Fax	6 (5.2)	13 (11.2)	23 (19.8)	74 (63.8)	0.58
Newspaper	15 (12.9)	66 (56.9)	10 (8.6)	25 (21.6)	1.61
Ipod	6 (5.2)	7 (6.0)	29 (25.0)	74 (63.8)	0.53
Newsletter	10 (8.6)	39 (33.6)	28 (24.1)	39 (33.6)	1.17

Source: Field survey, 2012

\*Figures in parentheses are percentages

**Technical constraints to use of ICT tools for extension delivery**

Table 4 shows the technical constraints faced by extension workers in an attempt to exploit ICT tools for extension services. Network fluctuation (42.2%) and lack of expertise on the part of the extension workers (51.7%) were outstanding technical constraints to the use of ICT tools for extension work in the study area. If one places the lack of expertise alongside the fact that close to half of the respondents are not computer literate, this can only be further compounded with frustration of network fluctuation. It is a common knowledge that even services like banking that

recently embraced internet and electronic based services suffer same fate in Nigeria as typified in epileptic service Automatic Teller Machine (ATM) largely due to network failure. Therefore, extension service delivery is not an exception but a confirmation of the need to improve on electronic based services generally in the country. Other technical constraints indicated by the extension workers included lack of software (39.7%) and dearth of appropriate infrastructure (38.8%). In earlier studies, Fawole and Olajide (2012) identified problems of infrastructure and fake/substandard hard and software.

**Table 4: Table showing technical constraints to use of ICTs tools for extension delivery**

Technical constraints	Very Serious Constraint	Serious Constraint	Mild Constraint	Not a Constraint
Low bandwidth.	35(30.2)*	34(29.3)	31(26.7)	16(13.8)
Lack of hardware.	35(30.2)	43(37.1)	25(21.6)	13(11.2)
Lack of appropriate infrastructure.	45(38.8)	49(42.2)	13(11.2)	9(7.8)
Lack of software.	46(39.7)	40(34.5)	19(16.4)	11(9.5)
Low numbers of Agro websites.	37(31.9)	25(21.6)	28(24.1)	26(22.4)
Weak telecommunication system.	33(28.4)	45(38.8)	23(19.8)	15(12.9)
Fluctuation of Network.	49(42.2)	45(38.8)	13(11.2)	9(7.8)
Lack of expertise.	60(51.7)	17(14.7)	26(22.4)	13(11.2)
Complexity of ICTs	43(37.1)	37(31.9)	26(22.4)	10(8.6)

Source: Field survey, 2012

\*Figures in parentheses are percentages

**Organisational constraints to use of ICT tools for extension delivery**

Data on organisational constraints facing ICT use in the study area in Table 5 reveals that insufficient computer training for extension personnel (41.4%) and poor funding for ICTs in extension organisations (33.6%) were considered very serious constraints to deployment of ICT tools for extension delivery. A critical assessment of these constraints will leave no one in doubt of the interrelated nature of these constraints. If

organisations are constrained in amount of fund available to pursue an innovation, necessary intervention suffers along the line. In this case, it is not surprising that as a result of poor funding for deliberate ICT promotion, sufficient training cannot be organised for extension personnel to take advantage of the plethora of opportunities offered by the technologies. Hence, extension organisations depend on individual extension agents' doggedness to engage themselves in self training.

**Table 5: Organisational constraints to use of ICT for extension delivery**

Organisational constraints	Very Serious Constraint	Serious Constraint	Mild Constraint	Not a Constraint
Lack of Interest by extension workers to use ICT	36(31.0)*	25(21.6)	29(25.0)	26(22.4)
Concerns about the risk of using ICT.	14(12.1)	30(25.9)	42(36.2)	30(25.9)
Lack of cyber-extension services.	34(29.3)	42(36.2)	16(13.8)	24(20.7)
Insufficient computer training for extension personnel	48(41.4)	36(31.0)	13(11.2)	19(16.4)
Poor funding for ICTs in extension organisation	39(33.6)	34(29.3)	20(17.2)	23(19.8)

Source: Field survey, 2012

\*Figures in parentheses are percentages

**Regulatory constraints to use of ICT tools for extension delivery**

Table 6 indicates that regulatory constraints identified as being very serious to the use of ICT tools for extension delivery were inadequate regulatory environment (48.3%) and strategic vision in developing ICT for rural areas (63.8%). These constraints reflect the general trend in the

neglect suffered by agriculture as a sub-sector of Nigeria's economy. Though, it is often been reiterated that agriculture has the potential to provide leverage for enhancement of our foreign earnings, positive policy steps on the part of government in this direction has not been forthcoming.

**Table 6: Regulatory constraints to use of ICTs for extension delivery**

Regulatory constraints	Very Serious Constraint	Serious Constraint	Mild Constraint	Not a Constraint
Lack of intellectual property right.	26(22.4)*	14(12.1)	34(29.3)	42(36.2)
Centralised extension planning.	29(25.0)	29(25.0)	28(24.1)	30(25.9)
Lack of policy support.	34(29.3)	28(24.1)	36(31.0)	18(15.5)
Inadequate regulatory environment.	56(48.3)	0(0.0)	45(38.8)	15(12.9)
Poor and outdated regulations.	74 (63.8)	9(7.8)	0 (0.0)	33(28.4)
Lack of strategic vision in developing ICT for rural areas.	41(35.3)	36(31.0)	28(24.1)	11(9.5)
Current regulatory structures.	24(20.7)	12(10.3)	46(39.7)	34(29.3)
Inability of national legislation to meet up with the speed of changes in technology.	22(19.0)	24(20.7)	42(36.2)	28(24.1)

Source: Field survey, 2012

\*Figures in parentheses are percentages

**Relationship between available ICTs, constraints and use of ICT tools for extension delivery**

Data in Table 7 indicates that there were no significant association between availability of ICT (r=0.877; p= 0.05), constraints ( $\chi^2=26.9$ ; p=0.05)

and the use of ICT tools for extension delivery. This implies that the much extension agents could do depends so much on available ICT tools at their disposal and enormity of challenges they have to cope with in exploring the tools for extension delivery.

**Table 7: Relationship between availability of ICT tools, constraints and the use of ICTs for extension delivery**

Variables	R	$\chi^2$ value	Df	Decision
Available ICTs tools	0.877			Significant
Constraints to ICTs usage		26.929	5	Significant

## CONCLUSIONS AND RECOMMENDATIONS

Most extension personnel in the study area are male, averagely educated but vastly experienced and in their active years. Mobile telephone, SMS and radio are the new and old ICT tools available for extension delivery. Constraints faced by extension workers include network fluctuation, lack of expertise on the part of the extension workers, insufficient computer training for extension personnel and poor funding for ICTs in extension organisations, inadequate regulatory environment as well as lack of strategic vision in developing ICT for rural areas. It is therefore recommended that ICT infrastructure be provided in extension organisations while all technical and regulatory issues be resolved to take full advantage ICTs offers.

## REFERENCES

- Agbamu, J. U. (2006). *Essentials of Agricultural Communication in Nigeria*. Malthouse Press Limited, Lagos, Nigeria.
- Arokoyo, T. A. (2010). *Rural Development Communication in Nigeria: Past, Present, and Future*. Professor Terry .A. Olowu Memorial Lecture, Department of Agricultural Extension and Rural Development, University of Ibadan, Ibadan, October, 27, 2010.
- Arokoyo, T. A (2011). *ICTs Application in Agricultural Extension Service Delivery*. In: AESON (2011), *Agricultural Extension in Nigeria (Second Edition)*. A publication of the Agricultural Extension Society of Nigeria (AESON). pp 245-251
- Fawole. O.P and Olajide B.R (2012) *Awareness and Use of Information Communication Technologies by Farmers in Oyo State, Nigeria*. *Journal of Agricultural & Food Information* 13:4, 326-337
- Idu, E.E and Obinne, C.P.O. (2009) *Promoting Effective Research-Extension-Farmer-Input Linkage System in Nigeria: Information and Communication Technology as a Cornerstone*. In: Agbamu, J.U (ed), *Perspectives in Agricultural Extension Rural Development*. Springfield Publishers Ltd, Owerri, Nigeria.
- Lawal-Adebowale O. A. (2009). *Information and Communication Technologies: Its Potentials for Enhanced Agricultural Extension Service and Rural Development..* In: Agbamu, J. U. (Ed) *Perspectives in Agricultural and Rural Development*, pp 214-258
- Olajide B. R and Amusat O. S (2013) *Use of Information Communication Technologies (ICTs) for extension delivery in selected research institutes and Agricultural Development Progarmmmes (ADPs) in Southwestern Nigeria*. *Ibadan Journal of Agricultural Research* Vol.9 pp218-225.
- Olajide B. R (2013) *Strategic communication framework for promoting improved certified cassava seeds in the Sustainable Cassava Seed System (SCSS) Project in Benue and Oyo States, Nigeria*. Technical report submitted to the Catholic Relief Services (CRS), Nigeria Programme. 27p
- Oluwatayo, I.B and Ahmed A. A (2007) *Gender Differentials in Information Communication Technologies (ICTs) Usage in Rural Nigeria: Case of Atisbo Local Government Area of Oyo State*. *Nigerian Journal of Rural Sociology*. Vol. 7, Nos 1 and 2, pp 57-70.
- Technical Centre for Agriculture and Rural Cooperation (CTA) (2003). *ICTS-Transforming Agricultural Extension? An*



e-discussion. Proceedings of ACT's  
6<sup>th</sup> consultative expert meeting ICTs-  
transforming agricultural extension?

Engelhard R. (Ed.) Wageningen, 23-25  
September 2003. 26pp.