S.Afr. Tydskr. Landbouvoorl./S. Afr. J. Agric. Ext., Oladele
Vol. 43, No. 2, 2015: 30 – 41
DOI: http://dx.doi.org/10.17159/2413-3221/2015/v43n2a344 (Copyright)

EFFECT OF INFORMATION COMMUNICATION TECHNOLOGY (ICT) ON AGRICULTURAL INFORMATION ACCESS AMONG EXTENSION OFFICERS IN NORTH WEST PROVINCE SOUTH AFRICA

Oladele, O. I.[7]

ABSTRACT

This study determined the effect of Information Communication Technology (ICT) on agricultural information access among extension officers in North West Province South Africa. A simple random sampling technique was used to select 169 officers from which data were collected with structured and face validated questionnaire. Fourteen statements were perceived by officers as having an effect on improving information access. Significant determinants of the effect of ICT on information access were education (t= 2.61, p = 0.11); constraints to ICT tools (t= 2.60, p = .010), use of ICT tools (t = 4.67, p = .000) and e-readiness (t= -3.01, p =.003).

Keywords: Information Communication Technology, information access, extension officers, agricultural information

1. INTRODUCTION

Information and Communication Technologies (ICTs) are all technologies used for the widespread transfer and sharing of information. ICTs are rapidly consolidating global communication networks and international trade with implications for people in developing countries. ICTs can be used to enable, strengthen or replace existing information systems and networks. ICTs promote and distribute new and existing farming information and knowledge which is communicated within the agricultural sector since information is essential for facilitating agricultural and rural development and bringing about social and economic changes (Swanson & Rajalahti, 2010).

Agriculture is the mainstay of most African countries and occupies a pivotal role in the development of the continent. It also remains an important sector in the South African economy due to its central role in building a strong economy, reducing inequalities by increasing incomes and employment opportunities for the poor, while nurturing natural resources. Over 50% of the total land in South Africa is used for Agriculture and Forestry and its contribution to the South Africa's economy is highly significant. Agriculture contributes 8% of the Gross Domestic Product (GDP) and over 17% to employment in South Africa (Statistics South Africa, 2003).

Agricultural Extension and advisory services in the field of agricultural development has seen many changes in the past decades. The first trend is the change in philosophy and rationale behind extension services towards more participatory approaches and participatory technology development (PTD), a shift has been made in thinking about the role of extension services in broader information and knowledge sharing processes (Leeuwis, 2004). A second trend in extension services, situated at a less conceptual level and a more professional level, seems to be the development towards 'extension-plus' which means that extension and

[7] Department of Agricultural Economics and Extension, North West University, Mafikeng Campus, South Africa. Email: Oladele20002001@yahoo.com

DOI: http://dx.doi.org/10.17159/2413-3221/2015/v43n2a344
advisory services plays an expanded role because extension has long been primarily associated with 'transferring technologies to farmers' (Sulaiman, 2003).

According to Munyua (2008), Information and knowledge play a central role in rural agricultural development. In describing the role of women and men in agricultural and rural development, information and knowledge are essential if women and men are to respond to opportunities and major challenges of the coming century. In emphasizing the role of information and knowledge, information and knowledge is described as prime productive resources. The Food and Agriculture Organization of the United Nations (2000) advances a corresponding view to this perspective in its assertion that "information and knowledge play a key role in ensuring food security and sustainable development". World Bank (2002, cited in *International Institute for Communication and Development* (IICD) 2006), also takes the position that "information and communication technologies are a key input for economic development and growth".

Munyua (2008) states that Africa has a cumulative body of agricultural information and knowledge, know-how and practices that need to be shared continent-wide and applied for improved livelihoods and sustainable development. Although there is a lot of information relevant to small-scale farmers, this is scattered and hard to find. Most of the institutions implementing initiatives on ICTs and small-scale agriculture in Africa have developed local agricultural information and knowledge resources in English, and in some cases, in local languages. Bertolini (2004) notes that most farmers in Africa rely on intermediaries such as nongovernmental organizations (NGOs), extensionists and producer organizations to access and exchange information on innovations in crop varieties, pest management, soil fertility, weather forecasting and irrigation among others. Wider access to such information and in a more cost effective manner ought to be given priority.

There seems to be recognition that extension should merge with, or at least should incorporate, other fields such as improved access to markets, research, advice, credit, infrastructure, farmer organization development and business development services. "Research and extension strategies should emerge out of a broader livelihood analysis organized through a wider consultative exercise." Next to these developments in fundamental thinking in the academic and professional worlds, a third global economic trend from public services to private services can be identified. Although, for instance in India, the state Department of Agriculture (DoA) continues to dominate extension provisions, initiatives towards privatization and public- private partnerships do exist (Sulaiman, 2003). Effective agricultural development requires access to information on all aspects of agricultural production, processing and marketing and it seems likely that if anything this need is increasing (Jones, 1997). ICT is already showing the potential to play an important role in the delivery of this information to this sector in both developed and developing countries. In most cases the base technology is universal, rather than being specific to agriculture, and hence usage evolves from existing designs and practices (Zijp, 1994).

The agricultural communications industry has changed because the agricultural industry itself is changing dramatically. There is more information but perhaps less knowledge than ever before in agriculture and that is a huge opportunity for extension officers. At the same time , the emergence of the internet as a communications medium, as well as the convergence of many other traditional communications vehicles like print, radio, television and database marketing, has a direct impact on extension officers approach their jobs (Boone, Meisenbach & Tucker,2000). According to Boone et.al, (2000) today agriculture holds a unique position

DOI: http://dx.doi.org/10.17159/2413-3221/2015/v43n2a344
in society. As more and more of the world's population moves from rural to urban areas, agriculture as a way of life is changing. Although its role in food production has not changed, however, and more and more of the world's food production is centred on agriculture with fewer and fewer people engaged in production farming. The gap between rural and urban society has narrowed. Media and popular culture have changed the way that farmers work, live and interact with other parts of society. Depending on the commodity in which a farmer specializes, information and technology is critical for efficiency and fiscal success. Technology is not limited entirely to the production aspects of agriculture. Farmers, as has much of society have adopted personal computers technologies into their farm operations; therefore computer technology is built into most equipment in use on farms today. Specialty crops and specialty farming operations are also tied into advanced technology.

Information and communicative technologies are key enablers of globalization. They allow for the efficient and cost-effective flow of information, products, people and capital across national and regional boundaries. ICT is not a panacea for rural development problems, but it has the potential to help the rural poor to leaping some of the traditional barriers to development, by improving access to information, expanding the market base, enhancing employment opportunities and making government services work better (Swanson & Rajalathi, 2010). Effective ICTs strategies must provide the basic infrastructure for connectivity and access, develop human capacity, offer affordable demand-driven ICT services and involve local stakeholders and beneficiaries in project design and implementation. Liberalization of the telecommunications sector can dramatically expand connectivity and reduce costs, but the strategic government investment or regulatory measures are needed in disadvantaged areas where the private sector does not provide services. Community- based telecentres offer a way of providing affordable access to ICT services in rural areas and this will assist agricultural extension officers to disseminate required farming information that will increase the agricultural productivity (Van Veldhuizen, Waters-Bayer, & De Zeeuw, 1997).

According to (Nagasri, 2000; Aizaki, Nakashima, Ujie, Takeshita & Tahara,2010), all agricultural extension and farmer programs face major challenges which are ensuring cost effective outreach, designing solutions tailored to needs of individual farmers and cultivating an image that is farmer friendly. Any change in technology, the economic impact of ICT occurs through improvements in efficiency and increasing productivity. This can take place in different ways including improving efficiency in resource allocation, reducing transaction costs, and technical improvements that result in an outward shifting of the production function. In particular, through the provision of information from a source that is relative affordable, accessible and broadly available, ICT can contribute to the reduction of uncertainty in activities and transactions, reduce the extent to which markets are thin, missing or incomplete, and reduce the extent to which information asymmetries can be exploited by the relatively informed to extract rent when transacting with the relatively uninformed.

2. PURPOSE AND OBJECTIVE

The purpose of this study is to determine the effect of Information Communication Technology on Agricultural Information Access among Extension Officers in North West Province South Africa. The specific objectives were to:

- Identify personal characteristics of extension officers.
- Examine the effect of Information Communication Technology on agricultural information access.

DOI: http://dx.doi.org/10.17159/2413-3221/2015/v43n2a344

- Ascertain the determinants of the effect of Information Communication Technology on agricultural information access

3. METHODS

The study was carried out in North West province, South Africa. The study population included all extension officers (200) in the province. A simple random sampling technique was used to select 169 extension officers from which data were collected. A structured questionnaire was designed based related literature and objectives of the study and comprised 37 items categorized as awareness level of information communication technologies. Validity of the instrument was ensured through a panel of experts in the Departments of Agricultural Economics and Extension and extension professionals from the Department of Agriculture and Rural Development, South Africa. The questionnaire had a reliability coefficient of 0.92 using the split half technique. Data were analysed with Statistical Package for Social Sciences (SPSS) using frequencies, percentages, mean and multiple regressions. The objective on effect of Information Communication Technology on agricultural information access is analysed using an ordinary least square (OLS) model. The OLS model for this study is specified as

$$Y_i = \alpha_0 + \alpha_1 X_{i1} + \cdots + \alpha_{25} X_{i25} + e \quad \text{..... (1)}$$

Where
$Y_i =$
effect of Information Communication Technology on agricultural information access

$Y_i = \alpha_0 + X_1 Gender + X_2 Age + X_3$ *marital status* $+ X_4$ *Marital status* $+ X_5$ *number of children* $+ X_6$ *Religion* $+ X_7$ *Educational qualification* $+ X_8$ *Studying for higher degrees* $+ X_9$ *household size* $+ X_{10}$ *working experience* $+ X_{11}$ *living in job location* $+ X_{12}$ *place of residence* $+ X_{13}$ *number of farmers covered* $+ X_{14}$ *distance to farmers* $+ X_{15}$ *awareness of ICT* $+ X_{16}$ *availability of ICT* $+ X_{17}$ *accessibility to ICT* $+ X_{18}$ *importance of ICT* $+ X_{19}$ *use of ICT* $+ X_{20}$ *constraints to ICT use* $+ X_{21}$ *e- readiness* $+ X_{22}$ *competence on use of ICT* $+ e$ *.....(2)*

4. RESULTS AND DISCUSSION

4.1 Personal characteristics of Extension Officers

The study reveals that majority (76%) of extension agents was men and (24%) were women. This implies that the extension workers were predominantly males. This may be connected with the gender disparity found in the public civil service in South Africa. With the socio-cultural factors that restrict contact between genders in some communities, appropriate use of ICTs in extension delivery could significantly reduce or eliminate such barriers. This finding is further supported by Aboh (2008) in Imo State, Nigeria that the majority of extension agents were males. Furthermore Arokoyo (2010) indicated that in Kaduna state, Nigeria the very limited number of female extension agents in the public service, coupled with the restrictions between male agents and female farmers, access to extension for these farmers could be severely limited. Hosseini, Niknami & Chizau (2009) also indicated that in Iran, majority of extension experts were men. Adesope, Asiabaka & Agumagu (2007) findings revealed that majority of the respondents were males in South Eastern Nigeria. Agwu, Uche-Mba & Akinnagbe (2008) noted that in Abia and Enugu States in Nigeria majority of the

extension workers are males. The findings of the study show that the age of extension officers ranged from 22 to 65 years, with 43% between 41 to 50 years and mean age of 44.6 years. This suggests that majority of the respondents were predominantly in their middle ages. This trend may have significant implication for ICTs usage since the elderly might be less interested in using hi-tech communication devices and prefer oral to printed information channels which are less efficient and younger extension officers are expected to have higher level of ICT awareness and utilization. Flor & Hazelman (2004) in Indonesia, most extension workers based in the local governments are beyond 40 years old and belong to the old school of information and communication and are awaiting retirement.

Majority of the extension officers in the study were married (79%); 73% of the respondents had less than three children. Oladele & Mabe (2010) and Oladele and Moilwa (2010) reported similar findings among extension officers in South Africa and Botswana respectively. Adebayo & Adesope (2007) also indicated that 70.4% of the extension officers in South Eastern Nigeria were married. The results by Adesope et al (2007) further revealed that most extension agents in Niger Delta, Nigeria were married. Seventy one percent of extension officers had a family household size of less than 5 persons. This finding is similar to that of Oladele & Mabe (2010), pointed out that there was a mean of 4.2 persons per household of extension officers in the North-West province. Diploma in agriculture was most common educational qualification that the majority 41% of respondents had, 10% having M. Inst Agrar, M. Tech and D. Tech, 20% had B. Tech, 15% had degrees, 11% had an honours qualification and the remaining 3% had certificates. Furthermore, 41% of the respondents indicated that they were studying further for higher degree. This implies that extension workers with higher level of education should be able to appreciate the use of ICTs in their agricultural research and extension work. Salau & Saingbe (2008) reported that majority (51.11%) of the extension workers in Trinidad and Tobago had National Diploma as their highest qualification. Agwu et al (2008) noted that in Abia and Enugu States in Nigeria 35.0% of the extension workers had Higher National Diploma (HND) certificates while 32.5% had BSc. Furthermore, Chizari, Lashgarara, Mirdamadi & Hosseini (2009) also noted that in Iran (68.2%) extension experts had a Bachelor's degree, and (31.2%) had Master's degrees. Purnomo & Lee (2010) reported that in Indonesia the highest level of education of the majority of extension officers is that of a Bachelor degree with (60.3%).

The study reveals that (43%) of extension officers had working experience of 6 - 20 years with a mean of 16.7 years. Thirty four percent had a working experience of above 20 years and 23% had a working experience of less than 5 years. Oladele & Mabe (2010) found that majority of the extension officers in the North-West province had a mean of 14 years as working experience. Chizari, Lashgarara, Mirdamadi & Hosseini (2009) found that most extension officers in Iran had 12 – 17 years of job experience; the mean was 12 years, and the values ranged from 1 to 29 years. Furthermore, Purnomo & Lee (2010) indicated that in terms of job category, majority of the respondents in Indonesia (50%) are general extension officers. This study suggests that the working experience of extension officers in South Africa is similar to other extension officers anywhere else in the world. The recent recall of retired extension officers in Zimbabwe corroborates that the working experience of extension officers play an important role in revitalizing the agricultural sector. Owens, Zinnah, Annor-Frempong & Apori (2001), noted that in Ghana Ministry of Food and Agriculture (MOFA) extension workers have worked an average of 13 years. Adebayo & Adesope (2007) further noted that female extensionists in South Eastern Nigeria reported work experience of between 3 and 8 years, with mean work experience of 4 years. Adesope et al (2007) reported that

DOI: http://dx.doi.org/10.17159/2413-3221/2015/v43n2a344
extension agents in Niger Delta, Nigeria had working experience ranging from 5 to 15 years with a mean working experience of 15.52 years.

Majority of extension officers lived in their job area **(**79%), and a further (75%) were residing within the circle of their job location with (49%) of the respondents being born in the rural area. The degree of extension officers' interaction with farmers could be influenced by the location of their residence, in terms of job designation, 43% were field officers/agents with the remaining percentage in higher cadre positions Oladele (2011). The finding of the study reveals that in terms of job designation (53%) is agricultural advisors with (36%) senior agricultural advisors. The majority (75%) covered less than 30 communities with a mean of 109.7, a further 78% covered less than 20 farmers groups with a mean of 52.8, and 20% of respondents covered 251 – 500 individual farmers with a mean of 403.7. Furthermore, 93.5% respondents indicated that they had access to subsidized transport to visit their clients; however 39% travelled more than 120 kilometres to visit their clients with a mean of 264.3 kilometres. This implies that the distance travelled by respondents to visit the clients have an effect on the number of farmers, farmer group and communities that are covered by extension workers in the study area. Furthermore respondents might not be able to have regular visits to their clients considering the numbers of clients that they work with and the extension service therefore must be appropriately supported with the use of ICTs.

This finding is similar to Arokoyo et al (2002), of the ratio of "between" 1:1000 and 1:2000 in the public extension service and women-in-agriculture program respectively in Nigeria, which was found to have several extension blocks expected to be filled by female extension agents, vacant. High transportation cost in the wake of inadequate budgets and inability of the extension workers to meet the need of a growing number of farmers spread out in fairly large areas. Moreover, the situation gets worsened with numerous vacant positions which further enhance the coverage area of each serving extension workers. Several studies including (Arokoyo et. al, 2002) have revealed that the village level extension agent is the most effective source of information for farmers but certainly not the most efficient in terms of cost and coverage.

4.2 Information Communication Technology and agricultural information access

From Table 1, on a 3 point scale rating of high (3), medium (2) and low (1), ICT tools were perceived by extension officers as having the effect on improving information access. Out of the 29 statements on effect of ICT on improving information access, only 14 statement were perceived highly positive by extension officers in the study area which included: increase information availability(66.9%), increase knowledge on farming activities (60.9%), improve quality of information and record keeping respectively (60.4%), improves awareness of agricultural events, news and information flow respectively (58%), enhances accuracy of information (55.6%), enhances capacity building (55%), encourages data sharing, dissemination and improve access to agricultural inputs respectively (54.4%), strengthening partnership with research and extension (53.8%), improved access to agricultural markets (52.7%), enhances timeliness of information and improve the relevance of research respectively (50.3%).The mean for most of these statements was above 2.00.The implication of the above findings is that extension officers are well aware of the role of ICTs in agricultural development and believes that ICTs should be inculcated in every aspect of agriculture including extension work since information is a necessary component of agricultural extension. The findings are supported by Ekwe Agwu & Uche-Mba (2010) showed that extension agents in Enugu State, Nigeria, perceived ICT to improve information

DOI: http://dx.doi.org/10.17159/2413-3221/2015/v43n2a344
access. It was further noted that ICTs can enhance the integration and efficiency of agricultural systems by opening new communication pathways and reducing transaction costs.

Oladele (2011) noted that extension agents in South Western, Nigeria perceived ICT to improve information access. Oladele (2011) further indicated that extension agents disagreed with statements that ICT encourages data sharing and dissemination improves the quality of information, improves relevance of research. This disagreement may be because these statements do not reflect the core activities of extension agents, implying that the use of ICT has been limited to the core activities of the respective respondents in this study.. This finding agrees with those of Richardson (2003) that ICTs are transforming extension services and also championing universal access.

Table 1: Effects of Information Communication Technology on improving information access

Effects	High	Medium	Low	Mean	SD
Increase knowledge on farming activities	103[60.9]	54[32.0]	12[7.1]	2.52	.68
Increase information availability	113[66.9]	40[23.7]	16[9.5]	2.54	.74
Increase information flow	98[58.0]	51[30.2]	20[11.9]	2.42	.79
Improve information seeking behaviour	75[44.4]	72[42.6]	22[13.1]	2.28	.76
Enhances accuracy of information	94[55.6]	51[30.2]	24[14.2]	2.34	.88
Enhances timeliness of information	85[50.3]	72[42.6]	27[16.0]	2.44	2.45
Encourages data sharing and dissemination	92[54.4]	51[[30.2]	28[16.5]	2.32	.87
Enhances multilingualism of agricultural information	69[40.8]	57[33.7]	43[25.4]	2.10	.90
Improves data management	78[46.2]	49[29.0]	24[14.2]	2.27	.82
Improve quality of information	102[60.4]	57[33.7]	17[10.1]	2.46	.77
Improve the relevance of research	85[50.3]	67[39.6]	27[15'9]	2.30	.83
Improve the timeliness of research	77[45.6]	50[29.6]	36[21.3]	2.17	.92
Improve access to agricultural inputs	92[54.4]	57[33.7]	19[11.3]	2,39	.78
Improved access to agricultural markets	89[52.7]	56[33.1]	28[16.5]	2.31	.86
Improved access to credit institutions	53[31.4]	58[34.3]	49[29.0]	1.95	.90
Improved awareness of agricultural events and news	98[58.0]	52[30.8]	21[12.4]	2.41	.81
Enhance decision making	76[45.0]	67[39.6]	29[17.1]	2.23	.84
Give voice to the voiceless	59[34.9]	50[29.6]	47[27.8]	2.02	.86
Reduce rural urban digital divide	47[27.8]	64[37.9]	58[34.3]	1.88	.86
Reduce rich-poor digital divide	37[21.9]	60[35.5]	72[42.6]	1.74	85
Reduce male-female digital divide	37[21.9]	67[39.6]	65[38.5]	1.74	.89
Improved cultural compatibility of agricultural issues	50[29.6]	78[46.2]	41[24.3]	1.95	.91
Improved social acceptability of agricultural issues	65[38.5]	65[38.5]	39[23.1]	2.07	.92
Improves record keeping	102[60.4]	44[26.0]	23[13.7]	2.43	.80
Reduces cost of interaction among stake holders	72[42.6]	61[36.1]	36[21.3]	2.14	.90
Enhances capacity building	93[55.0]	61[36.1]	15[8.9]	2.43	.73
Changes the function of extension services	8248.5]	59[34.9]	28[16.5]	2.26	.862
Strengthening partnership with research and extension	91[53.8]	48[28.4]]	30[17.7]	2.30	.89
Enhances timely feedback from farmers/research	84[49.7]	49[29.0]	36[21.3]	2.23	.89

4.3 Determinants of effects of Information Communication Technology on information access

The regression results are presented in Table 2. It is noted that four out of the 21 variables were significant at 10% and5% respectively. The variable that had a 10% significance level were highest education qualification (t= 2.61, p = 0.11); constraints to ICT tools (t= 2.60, p = .010) and variables with the significance level of 5% were use of ICT tools (t = 4.67, p = .000) and e-readiness of extension officers (t= -3.01, p = .003). The highest level of education

DOI: http://dx.doi.org/10.17159/2413-3221/2015/v43n2a344
had a significant positive impact on the effect of information access by extension officers in the North-West Province. This means that a unit change in the highest educational qualification lead to an 18.0% unit increase in the effect of information access by respondents. This suggests that as respondents obtain higher educational qualification level the effect of ICT on agricultural information access is improved. This is further supported by the results of Oladele (2011) indicated a significant difference exists in the effect of ICT on agricultural information access among researchers, extension agents, and farmers in South Western Nigeria was observed. This means that access to agricultural information through ICT will continue to improve when the educational qualification increases. Furthermore Lynch (2001) indicates that positive attitude, knowledge and skills of extension experts directly impact on the application of ICTs. The constraints to use of ICT tools by extension officers had a highly significant impact on the effect of ICT on information access. This implies that a unit increase on the use of ICT tools by extension officers will lead to a 44.4% change on the effect of ICT on information access of all other factors held constant. This may be influenced by the use of ICT tools by respondents most often, the more they experience the effects of ICT tools on information. The regression results indicate that the effect of e-readiness among extension officers had a negative impact on the effect of ICT on information access. This implies that a unit change in e-readiness of extension lead to a 25.0% unit decrease in the effect of ICT on information access by 24%. This might be due to the fact that when respondents level of e- readiness improves the easier it is for them to identify the effect of ICT on information access. This finding agrees with those of Richardson (2003) that ICTs are transforming extension services and also championing universal access. The competence on use of ICT tools had a significant positive impact on the effect of ICT on information access by respondents. This means that a unit increase in constraints of ICT encountered by extension officers, lead to a unit increase by 25% on the effect of ICT on information access. This may be due to the fact that as respondents experience more constraints to ICT tools, the less the ICT will have an effect on information access. Asian Development Bank, (2011) further reported that inadequate infrastructure to use ICTs, far away locations of service centre's to maintain and repair ICT devices and systems, small markets, Inadequate financial resources, which make ICTs less affordable, and lower levels of literacy and ICT literacy, low awareness of opportunities and benefits that ICTs can provide are some of the constraints that have a negative effect of ICT on information access by extension officers.

DOI: http://dx.doi.org/10.17159/2413-3221/2015/v43n2a344

Table 2: Multiple regression of effect of information access in using ICT tools and socio-economic characteristics of extension officers

Variables	B	SE	Beta	t	p
(Constant)	26.664	11.794		2.261	.025
Gender	4.264	3.042	.113	1.402	.163
Age	-.097	.206	-.053	-.469	.640
Marital Status	-.077	1.007	.006	.077	.939
Number of children	.790	1.102	.067	.716	.475
Religion	1.671	1.742	.070	.959	.339
Educational qualification	1.971	.764	.180	2.581	.011
Studying for a higher degree	-1.036	2.331	-.031	-.444	.657
Household size	-.322	.607	-.041	-.530	.597
Working experience	-.180	.162	-.117	-1.110	.269
Living in job location	-4.597	2.888	-.112	-1.592	.114
Place of residence	.184	2.119	.006	.087	.931
Number of farmers covered	.002	.002	.064	.879	.381
Distance to farmers	-.001	.002	-.045	-.627	.532
Awareness of ICT	.056	.107	.071	.520	.604
Availability of ICT	.276	.168	.316	1.646	.102
Accessibility to ICT	-.204	.204	-.240	-.996	.321
Importance of ICT	-.082	.164	-.106	-.501	.617
Use of ICT	.108	.115	.146	.938	.350
Constraints to ICT use	.841	.184	.444	4.566	.000
Effect on officers e –readiness	-.781	.301	-.250	-2.599	.010
Competence on ICT use	.903	.300	.239	3.009	.003
F	3.722				
P	.000				
R	.589				
R square	.347				
Adjusted R	.254				

5. CONCLUSION AND RECOMMENDATION

This study examined the effect of Information Communication Technology (ICT) on agricultural information access among extension officers in North West Province South Africa.. The study has highlighted that extension officers in North West Province of South Africa were prominently male, with a mean age of 44.6 years married, with Diploma as educational qualification, had a mean household size of 5 persons and mean working experience of 16.7 years and live in their job location. Extension officers had high perception of the effect of ICT on agricultural information access. Prominent statement perceived highly positive by extension officers in the study area on the effect of ICT on agricultural information access include: increase information availability, increase knowledge on farming activities, improve quality of information and record keeping respectively, improves awareness of agricultural events, news and information flow respectively, enhances accuracy of information, enhances capacity building agricultural markets, enhances timeliness of information and improve the relevance of research respectively. Significant determinants of the effect of ICT on information access were education (t= 2.61, p = 0.11); constraints to ICT tools (t= 2.60, p = .010), use of ICT tools (t = 4.67, p = .000) and e-readiness (t= -3.01, p = .003). Based on the findings of the study, it is important that constraints to the use of ICT

DOI: http://dx.doi.org/10.17159/2413-3221/2015/v43n2a344
tools by extension officer be eliminated and the use of ICT tools by extension officer be improved. There is also need for the educational level of extension officers to be improved through the acquisition of more related qualification. The study also recommends that the e-readiness (a composite of access, availability, accessibility, competence and use of ICT tools) of extension officer be enhanced by effective policy and adequate provision of ICT tools.

REFERENCES

ABOH, C. L., 2008. Assessment of the frequency of ICT tools usage by Agricultural Extension agents in Imo State, Nigeria, *Journal of Agriculture and Social Research,* 8 (2)

ADEBAYO, E. L. & ADESOPE, O. M. 2007. Awareness, access and usage of information and communication technologies between female researchers and extensionists, International Journal of Education and Development using Information and Communication Technology (IJEDICT), , Vol. 3, (1), pp. 85-93.

ADESOPE, O. M., ASIABAKA, C. C. & AGUMAGU, A. C. 2007. Effect of personal characteristics of extension managers and supervisors on information technology needs in the Niger Delta area of Nigeria, *International Journal of Education and Development using ICT*, 3 (2):

AGWU, A. E., UCHE-MBA, U. C. & AKINNAGBE, O. M. 2008. Use of Information Communication Technologies (ICTs) among Researchers, Extension Workers and Farmers in Abia and Enugu States: Implications for a National Agricultural Extension Policy on ICTs. Journal of Agricultural Extension Vol. 12 (1) :37-49

AIZAKI, H., NAKASHIMA, Y., UJIE, K., TAKESHITA, H., & TAHARA, K., 2010. Influence of Information about Agrochemicals provided via Internet –enabled mobile phones on Consumer Valuation of food, *Journal of Agricultural & food information*,11(3):209 -211.

AROKOYO, T., CHIKWENDU, D., & OGUNBAMERU, K., 2002. *A study of the access of Rural Women to Public and Private Extension Service in Nigeria*. Report of a study commissioned and funded by CTA.

AROKOYO, T. 2010. ICTs in the transformation of Agricultural Extension: The case of Nigeria, Available on line: www.fao.org, Accessed: 19- 10 -2010.

ASIAN DEVELOPMENT BANK 2011. Key Indicators for Asia and the Pacific: Framework of Inclusive Growth Indicators 2011 Special Supplement. Manila

BERTOLINI, R. 2004. Strategic thinking: making information and communication technologies work for food security in Africa. Available online: http://www.ifpri.org/pubs/ib/ib27.pdf Accessed 06 -09- 2010.

BOONE, K., MEISENBACH, T., & TUCKER, M. 2000. *Agricultural Communications: Changes and Challenges*. Iowa State University Press, Iowa, pp. 45-68.

CHIZARI, M., LASHGARARA, F., MIRDAMADI, S, M., & HOSSEINI,S. J. F. 2009. Role of information and communication technologies in improving food availability of Iranian rural households,2009, *International Journal of Education and Development using Information and Communication Technology, (IJEDICT),* Vol. 5,(3), pp. 193-205

FAO 2000. Report of the First Consultation on Agricultural Information Management, Rome 5–7 June 2000. Rome: Food and Agriculture Organisation of the United Nations

FLOR, A. G. & HAZELMAN, M. 2004. Regional Prospects and Initiatives for Bridging the Rural Digital Divide, AFITA/WCCA Joint Congress on IT in Agriculture, Available online www.upou.edu.ph/downloads/2004AFITA.pdf Accessed:15- 03-2011.

HOSSEINI, S. J. F., NIKNAMI, M., & CHIZARI, M. 2009. To determine the challenges in the application of ICT's by the agricultural extension service in Iran, *Journal of Agricultural Extension and Rural Development,*1 (1) :027 -030.

INTERNATIONAL INSTITUTE FOR COMMUNICATION AND DEVELOPMENT (IICD**)** 2006. ICTs for agricultural livelihoods: impact and lessons learned from IICD supported activities. The Hague: IICD.

JONES, G. E. 1997. The history, development and the future of agricultural extension in Swanson, B.E., Bentz, R. P. & Sofranko, A. J. (eds) Improving agricultural extension – a reference manual. Rome: FAO.

LEEUWIS, C. 2004. Communication for Innovation: Rethinking Agricultural Extension, 3rd edition, Blackwell Science Ltd, pp.117 – 125.

LYNCH, M. M. 2001. The online educator: a guide to creating the virtual classroom. Routledge, London.

MUNYUA, H. 2008. Report on ICTs and small - scale Agriculture in Africa: A scoping study, The International Development Research Centre (IDRC), pp: 1 - 62.

NAGARSI, K. 2000. Assess of creative potential and practice of extension personnel. IARI Pusa, New Delhi, pp. 12- 20.

OLADELE, O. I., & MABE, L. K. 2010. Job burnout and coping strategies among extension officers in North West province, South Africa, *African Journal of Agricultural Research* 5(17), 2321-2325.

OLADELE, O. I. & MOILWA, M**.** N. 2010. Cattle farmers' willingness to establish private grazing lands in Mahalapye, Botswana, *Livestock Research for Rural Development. (22):159.*

OLADELE, O. I. 2011. Effect of Information Communication Technology on Agricultural Information Access Among Researchers, Extension Agents, and Farmers in South Western Nigeria, *Journal of Agricultural and Food Information* 12(2): 167- 176.

OWENS, M. E. ZINNAH, M. M., ANNOR-FREMPONG, F. & APORI, S. 2001. Tertiary Education for Mid-Career Level Extension Personnel: Ghana Case Study, SD Dimensions (FAO), Available on line: http://www.fao.org/sd/2001/KN0501a_en.htm**,** Accessed: 20-04-2011

PURNOMO, S. H. & LEE, Y, H., 2010. An Assessment of Readiness and Barriers towards ICT Programme Implementation: Perceptions of Agricultural Extension Officers in Indonesia, *International Journal of Education and Development using Information and* Communication Technology (IJEDICT), Vol: 6(3): 19-36.

RICHARDSON, D. 2003. Agricultural extension transforming ICTs? Championing universal access (Background Paper for CTA's ICT Observatory), Available on line: http://www.cta.int/fr/content/download/2792/20425/version/1/file/background paper2003.pdf, Accessed: 10-08- 2010

SALAU, E. S. & SAINGBE, N. D. 2008. Access and Utilization of Information and Communication Technologies (ICTs) Among Agricultural Researchers and Extension Workers in Selected Institutions in Nasarawa State of Nigeria, PAT: 4 (2): 1-11 Available online: www.patnsukjournal.com/currentissue

STATISTICS SOUTH AFRICA (SSA) 2000. Agricultural Households Census, www.ssa.co.za, Accessed: 02-December 2010.

SULAIMAN, R. 2003. Agricultural Extension: Involvement of Private Sector, National Bank for Agricultural and Rural Development, Mumbai, India.

SWANSON, B. E. & RAJALAHTI, R. 2010. Strengthening Agricultural Extension and Advisory Systems: Procedures for Assessing, Transforming and Evaluating Extension Systems, The International Bank for Reconstruction and Development/The World Bank, Washington, pp. 98 – 127.

VAN VELDHUIZEN, L., WATERS-BAYER, A., & DE ZEEUW, H. 1997. *Developing Technology with Farmers: A Trainers Guide for Participatory Learning*, Zed Books Ltd, UK, pp. 192- 206.

ZIJP, W., 1994. Improving the transfer and use of agricultural information: A guide to information technology, The International Bank for Reconstruction and Development, Washington, 247 World Bank Discussion Papers, pp.1- 41.