

Original Research Article

Effect of Information Communication Technologies on Information Access in Lesotho Extension System

Akintunde* M.A.O. and Oladele O.I.

Abstract

Department of Agricultural Economics and Extension, Faculty of Natural and Agricultural Sciences, North West University, Mafikeng, South Africa

*Corresponding Author's Email:
maakintunde@gmail.com
Tel: +26658865964

The study assessed the effect of Information Communication Technologies on information access among public and private agricultural extension officers in Lesotho. ICT infrastructure in Lesotho is currently low, with accessibility to telecommunication services of about 3% of the entire population for land telephone lines and just about 20% for mobile phone. Lesotho ICT policy has provided guidance by allocating various responsibilities to role players: this involves the Ministry of Communications to formulate policies and the Lesotho Telecommunication Authority (LTA) to regulate operations in communication infrastructure. However, the effect of ICT on information access among extension officers is still not known. A structured questionnaire was used to collect data from 86 public and 19 private extension officers. Data collected were analysed through the Statistical Package for Social Sciences (SPSS), using frequencies, percentages, mean, standard deviation and multiple regressions. Both categories of extension officers (public and private) had very high perceptions of the positive effects of information and communications technology on access to information. They scored high in most of the twenty-nine statements measuring these effects. The multiple regression model revealed a strong relationship between independent variables and public and private extension officers' information access. Collaborations between public and private extension should be strengthened, since private extension service is more organized than the public, this will help the use of ICT in the development programmes in the country.

Keywords: ICT, information access, Public extension, Private extension, Lesotho

INTRODUCTION

Most people in Lesotho dwell in rural villages, where majority of them survive in engaging in agricultural activities (Lesotho Review, 2015). The country's land is largely infertile and hilly. Cereal production contributes to less than 30% of people's needs. Therefore more than 60% of Lesotho's food requirements and livestock are imported from South Africa. Agriculture is mainly traditional characterized by rain-fed cereal production and extensive cattle grazing with livestock output almost doubling that of arable sector (Lesotho Review, 2015). The nation's economy has constantly benefitted from livestock rearing, hunting, fishery, forestry and crop production for the past half a decade. Contributions of

these agricultural sectors reached 8% in 2008 and about 7.9% of the GDP in 2013. However, this is a decline from 20% of GDP from three decades ago (Lesotho Review, 2015).

In the past decades there has been an increase in the use of mobile phones all over the world. As at 2012 the world population was 7.1 billion, the International Telecommunication Union (ITU) estimated that there were 6.8 billion mobile phone subscribers worldwide (ITU, 2013). In general, television and radio are used for awareness creation and transfer of technology however mobile phones are mainly utilized for collecting and disseminating advisory and marketing information, such

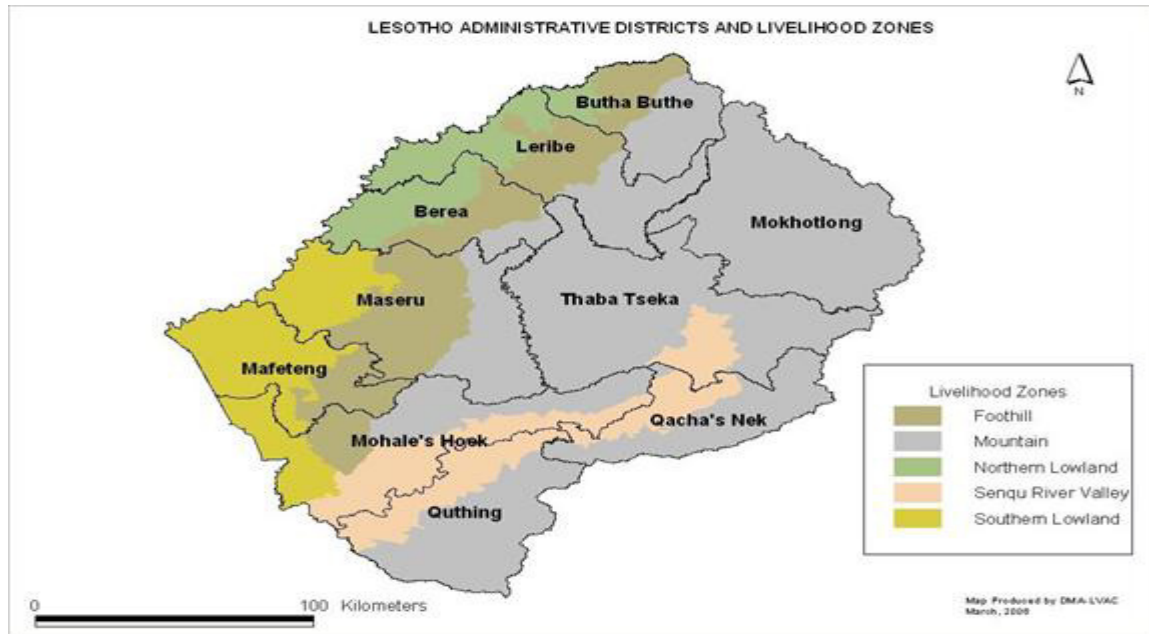


Figure 1. Lesotho Administrative Districts and Livelihood Zones

as prices and location. Agriculture is an important sector with a majority of the rural population in developing countries depending on it (Mokotjo and Kalusopa, 2010). Ezeh (2013) reported that radio and television, followed by phone were the most accessed and utilized ICTs among officers in South Eastern Nigeria.

ICT infrastructure in Lesotho is currently low, with accessibility to telecommunication services of about 3% of the entire population for land telephone lines and just about 20% for mobile phone (Maphethe et al., 2014). Personal computers are primarily confined to urban areas and were estimated to be less than 30,000 in the year 2000. Lesotho ICT policy has provided guidance by allocating various responsibilities to role players: this involves the Ministry of Communications to formulate policies and the Lesotho Telecommunication Authority (LTA) to regulate operations in communication infrastructure. According to 1ST Africa (2012), despite Lesotho's poor ICT infrastructures, initiatives have been taken to promote ICT access and usage in educational institutions. This was done through two key projects: The New Partnership for Africa's Development (NEPAD) e-schools demo project and SchoolNet Lesotho. These projects aim to impact ICT skills and knowledge by providing education in schools through application of ICT and internet usage.

Vincent and Cull (2013) reported a positive relationship between mobile phones and development in their study. In this project, ten mobile phones ("Ten Seeds") were distributed to remote rural women-led cooperative farmers in Lesotho. This effort brought economic growth via improved communication which in turn helped them to seek markets, reduce wastage and

travel cost. Farmers were also empowered by improving their mathematics literacy skills through the use of calculators.

The major Objective is to analyse the effect of Information Communication Technologies on Information access among public and private agricultural extension officers in Lesotho. The specific objectives were to identify the demographic characteristics and assess determinants of effects of ICT use on agricultural information access by public and private agricultural extension officers in Lesotho.

METHODOLOGY

The study was carried out in Lesotho. Lesotho is a landlocked country, entirely surrounded by the Republic of South Africa with a population of 1.9 million (CIA fact book, 2015), with 76.3% residing in rural areas. About 10% of its total land area of 30,352 km² is cultivable, two-third of which lie in the lowlands and foothills. The majority of Lesotho's population live in rural areas practicing subsistence farming. They produce maize, sorghum, peas, beans, wheat, oil seeds, nuts, soya, potatoes, and vegetables (Mokotjo and Kalusopa, 2010). The livestock industry produces mainly beef (43 percent), followed by game (17.6 percent), mutton (14.3 percent), pork (12.4 percent), goat meat (7.3 percent) and chicken (5.4 percent). Cattle are chiefly raised for consumption, draught power, milk, fuel (dung) and meat. (Figure 1)

The population of the study comprised of 310 public agricultural extension workers in the ten districts of Lesotho. However, only eight districts were able to

Table 1. Demographic characteristics of public and private agricultural extension officers

Variables		Public officers n = 86	Private officers n=19
Gender	Male	30 (34.9)	7 (36.8)
	Female	56 (65.1)	12 (63.2)
Age		Mean = 39.5 SD=7.27	Mean=32.5 SD=6.28
Marital status	Married	63 (73.3)	10 (52.6)
	Widow	6 (7.0)	0 (0)
	divorced	2 (2.3)	1 (5.3)
	separated	1 (1.2)	0 (0)
	single	14 (16.3)	8 (42.1)
Number of children		Mean=1.9 SD=1.13	Mean=0.9 SD=0.88
Religion	Christian	77 (89.5)	16 (84.2)
	Islam	1 (1.2)	0 (0)
	Traditional	1 (1.2)	1 (5.3)
	Other	7 (8.1)	2 (10.5)
Highest qualification	High school	1 (1.2)	0 (0)
	Certificate	29 (33.7)	0 (0)
	Diploma	34 (39.5)	6 (31.6)
	Bachelor degree	20 (23.3)	12 (63.2)
	Masters' degree	2 (2.3)	1 (5.3)

*Figures in parenthesis are percentages

participate in the study due to administrative challenges in two districts, reducing the public extension officers' population to 250. Private extension respondents are made up of extension officers from five Non-Governmental Organisations that were fully involved in agricultural extension services at the time of the study. There were a total of 19 private extension officers from the following NGOs in Lesotho: World Vision, SEND A COW, Rural Self-Help Development Association (RSDA), GROW, and Serumula Development Association.

An online Raosoft sampling engine was used to calculate the sample size of 152; a simple random sampling technique was then used to select 152 from a list of 250 at the Department of Field Services in Maseru. However, only 86 public extension officers were able to return well filled questionnaires that were eventually analysed for the study. All the 19 private extension officers were selected because of their low number. This made a total of 105 respondents for the study. The instrument was content and face validated by experts in the department of Agricultural Economics & Extension, North-West University Mafikeng, South Africa. Reliability was determined by using Split-half technique. The statements were split into two halves on the basis of odd and even numbered statements and then administered to twenty respondents from the Department of Field Services (DFS), Maseru. Cronbach's alpha coefficient obtained from the two sets of scores was 0.79, indicating that the instrument was reliable. Thakur et al., (2017) explained that the closer the value of Cronbach's alpha coefficient to 1, the higher the reliability. These respondents in the pilot study were not involved in the actual study. Data were analyzed using the Statistical Package for Social Sciences (SPSS 22), using percentages, frequencies, and mean.

RESULTS AND DISCUSSION

Demographic characteristics of public and private extension officers in Lesotho

Table 1 shows that Agricultural Extension Officers were predominantly female in both categories of extension, public (65.1%) and private (63.2%). This contradicts Mabe and Oladele (2012) who reported males to be dominant as extension officers, however, Nyamba and Mlozi (2012) reported similar findings with 52.1% female extension officers. The reason for more female extension officers in Lesotho could be attributed to the fact that more females are exposed to education than males. Extension jobs demand some levels of educational qualification, therefore female Basotho are likely to be more employed in this sector. The mean age of public extension officers (39.5 years) was slightly higher than that of the private officers (32.5 years). Both age means are still lower than the 45 years which is considered to be good for ICT usage. The lower age mean in private extension in this study is probably due to the contractual nature of their jobs which ensure constant movement from one organization to another. In public extension, jobs are more permanent and extension officers are patient to work until retirement age when they can claim their gratuity, pension and other benefits. Samansiri et al. (2014) reported that 48.5% of extension officers in their study were above 45 years of age. The table also showed that 73.3% of public extension officers are married compared to 52.6% of the private officers, while single officers in public (16.3%) are far less than those of private officers (42.1%). This corroborates the fact that private officers are younger and may not be ready for marriage. Mean number of children in public and private

Table 2. Effects of ICT tools on access to information

Effects of ICT	Public officers n = 86		Private officers n =19		t value
	Mean	SD	Mean	SD	
Increases knowledge of farming activities	2.30	.69	2.58	.69	-1.58
Increases availability of information	2.33	.78	2.68	.48	-2.62**
Increases flow of information	2.30	.69	2.58	.69	-2.33**
Increases information-seeking behaviour.	2.01	.79	2.58	.51	-2.27**
Enhances accuracy of information	2.19	.74	2.74	.45	-4.20***
Enhances timeliness of information	2.21	.72	2.74	.56	-3.50***
Encourages data sharing and dissemination	2.26	.74	2.68	.58	-2.75***
Enhances multilingualism of agricultural information	1.95	.73	2.37	.83	-2.01*
Improves data management	2.10	.78	2.52	.69	-2.33**
Improves quality of information	2.36	.64	2.47	.77	-.59
Improves relevance of research	2.08	.75	2.32	.82	-1.14
Improves timeliness of research	2.02	.74	2.32	.82	-1.43
Improves access to agricultural inputs	2.07	.72	2.37	.89	-1.36
Improves access to agricultural markets	2.23	.66	2.37	.83	-.67
Improves access to credit institutions	1.77	.81	1.95	.91	-.80
Improves awareness of agricultural events and news	2.29	.67	2.42	.77	-.69**
Enhances decision-making	2.16	.73	2.31	.67	-.88
Gives voice to the voiceless	1.92	.71	2.26	.87	-1.61.
Reduces rural-urban digital divide	1.83	.71	2.37	.68	-3.11***
Reduces rich-poor digital divide	1.71	.70	2.32	.75	-3.23***
Reduces male-female digital divide	1.74	.71	2.42	.77	-3.52***
Improves cultural compatibility of agricultural issues	1.98	.72	2.26	.81	-1.43
Improves social acceptability of agricultural issues	2.05	.70	2.47	.77	-2.22**
Improves record-keeping	2.31	.69	2.21	.79	.53
Reduces cost of interaction among stakeholders	2.01	.71	2.37	.68	-2.04*
Enhances capacity building	2.22	.73	2.42	.69	-1.13
Changes the function of extension services	2.09	.69	2.42	.69	-1.87*
Strengthens partnership with research and extension	1.93	.76	2.53	.61	-3.66***
Enhances timely feedback from farmers/research	1.92	.79	2.21	.79	-1.46

Note: Levels of significance: *** 1%, ** 5%, * 10%

extension officers is 1.9 and 0.9 respectively; this is about ratio 2:1. The implication of this is that public officers have more children which may take more of their time and affect their use of ICTs. Majority in both categories are Christians, 89.5% and 84.2% respectively. This is not different from other studies in Southern African countries where the general population are predominantly Christians. In Lesotho, 90% of people are Christians while other types of religions are practiced by 10% of people (Amriah et al., 2014). Furthermore 39.5% of the public officers have diploma as their highest academic qualifications while 63.2 % of private have Bachelor's degree. This indicates that private extension probably demands higher qualifications for employment of extension officers. Majority in both categories are not pursuing higher degrees and only 2.3% and 5.3% are expecting Master's degrees respectively. This may be

due to reasons that extension officers have no time or resources to pursue further studies.

Effects of ICT on improving access to information among public and private extension officers

Table 2 shows the perceptions of public and private extension officers with regard to the effects of ICT tools on improving access to information. On a three point scale of high (3), medium (2) and low (1), extension officers were rated on their perception of ICT tools as having an effect on improving access to information. The sum of the score for each statement was calculated and the mean found. Overall means of 2 or above were considered to be positive statements of the effects of ICT on access to information, overall means of less than 2

Table 3. Determinants of the effects of ICT tools on access to information

Variables	B	Standard Error	Standardized Coefficients Beta	T	Sig
(Constant)	31.170	18.573		-1.684	.096*
Gender	4.722	2.592	.156	1.822	.072*
Age	.401	.173	.209	2.312	.023**
Religion	2.310	1.464	.139	1.579	.118
Live in job area	2.154	3.804	.055	.566	.573
Residence	1.030	3.434	.031	.300	.765
Means of mobility	.774	1.640	.041	.472	.638
Awareness	-.353	.240	-.246	-1.472	.144
Availability	-.420	.448	-.198	-.937	.351
Accessibility	.275	.421	.141	.652	.516
Competence	.583	.320	.290	1.822	.072*
Importance	.017	.221	.011	.078	.938
Constraints	-.100	.376	-.023	-.265	.792
E-readiness	.980	.575	.185	1.075	.092*
Use of ICT	1.136	.219	.545	5.198	.000***
Type of extension	7.981	4.030	.212	1.981	.051*
F	4.751				
P	.000 ^b				
R	.667 ^a				
R squared	.445				
Adjusted R squared	.351				

Note: Levels of significance: *** 1%, ** 5%, * 10%

indicated a negative statement for the effect.

Public extension officers considered twenty statements positive out of twenty nine, namely; increase knowledge of farming activities (2.30), increases availability of information (2.33), increases flow of information (2.30), increases information-seeking behaviour (2.01), enhances accuracy of information (2.19), enhances timeliness of information (2.21), encourages data sharing and dissemination (2.26) and improves data management (2.10). Other statements were as follows: improves quality of information (2.36); improves relevance of research (2.08); improves timeliness of research (2.02); improves access to agricultural inputs (2.07); improves access to agricultural markets (2.23); improves awareness of agricultural events and news (2.29); enhances decision-making (2.16); improves social acceptability of agricultural issues (2.05); improves record-keeping (2.31); reduces cost of interaction among stakeholders (2.01); enhances capacity building (2.22); and changes the function of extension services (2.09). Furthermore, nine statements were scored negative by public extension officers as follows: enhances multilingualism of agricultural information (1.95); improves access to credit institutions (1.77); gives voice to the voiceless (1.92); reduces rural-urban digital divide (1.83); reduces rich-poor digital divide (1.71); reduces male-female digital divide (1.74); improves cultural compatibility of agricultural issues (1.98); strengthens partnership with research and extension (1.93); and enhances timely feedback from farmers/research (1.92).

Private extension officers, on the other hand, considered twenty-eight out of twenty nine statements to be positive of the effects of ICT on access to information. The only negative statement was: improved access to credit institutions (1.95). This can be interpreted that public and private extension officers considered ICT tools as integral part of extension that should be used in extension practices. It also implies that both public and private extension officers are aware of the benefits that could be derived from the use of ICT in the course of their work. The results are similar to those of Agwu *et al.* (2008), who found that extension agents in Enugu State, Nigeria, perceived ICT to improve access to information and could enhance integration and efficiency of agricultural systems. The findings also revealed a highly significant statistical difference between public and private extension officers in the following statements: enhances timeliness of information ($t = -4.20^{***}$), encourages data sharing and dissemination ($t = -2.75^{***}$), reduction in rural-urban divide ($t = -3.11^{***}$), reduces rich-poor digital divide ($t = -3.23^{***}$), reduces male-female digital divide ($t = -3.52^{***}$) and strengthens partnership with research and extension ($t = -3.66^{***}$).

Determinants of effect of ICT on information access among public and private extension officers

Multiple linear regression analysis was performed in order to determine the extent to which each independent variable explains the variance of the effects of ICT tools

on access to information among public and private extension officers. The results of the regression analysis are presented in Table 3. It was revealed that predictor variables have significant relationships with the perceptions of extension officers with regard to the effects of ICT tools on access to information: ($R = .667$) and 44.5% of the variation in access to information of extension officers was explained by the predictor variables. Furthermore, an F value of 4.751, $p < .01$ revealed a strong relationship between independent variables and access to information by extension officers. Six out of the fifteen variables were significant determinants of the effects of ICT tools on access to information. These variables were: gender ($t = 1.822$ $p = .072^*$); age ($t = 2.312$ $p = .023^{**}$); competence in the use of ICT ($t = 1.882$ $p = .072^*$); e-readiness ($t = 1.075$ $p = .092^*$); use of ICT ($t = 5.198$ $p = .000^{***}$); and type of extension ($t = 1.98$ $p = .051^*$).

There was a positive and significant correlation between gender and the effects of ICT on access to information of extension officers. This implies that female extension officers may be different in terms of their perception with regard to the effects of ICT on access to information.

Results of the regression analysis also indicated that age of extension officers had a positive significant impact on the effect of ICT on access to information. This implies that a unit increase in the age of extension officers will lead to 20.9% increase on the effect of ICT on access to information if all other factors were held constant. This further implies that older extension officers perceive ICT as improving access to information compared to younger ones. This is an indication that getting more experience on the job exposes extension officers to the positive effects of ICT on access to information.

Competence in the use of ICT had a significant positive impact on the effect of ICT on access to information by respondents. This implies that a unit increase in competence level of extension officers leads to 29% unit increase on the effects of ICT on access to information. This further implies that the more respondents become competent in the use of ICT, the more they realize the effects of ICT on access to information. The results further revealed that e-readiness among extension officers had a positive significant impact on the effects of ICT on access to information. This implies that a unit increase in e-readiness of extension officers leads to 18.5% unit increase in the effect of ICT on access to information.

Furthermore, use of ICT by extension officers had a highly significant positive impact on the effects of ICT on access to information. This means that a unit increase in the use of ICT by extension officers leads to 54.4% unit increase in the effects of ICT on access to information. This implies that frequent use of ICT by extension officers in Lesotho will improve their access to agricultural information. Oladele (2015) obtained similar results

among extension officers in the North West Province, South Africa, where it was discovered that significant determinants of the effects of ICT on access to information 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 ($t = -3.01$, $p = .003$).

The results also showed that the category of extension officers had a positive significant impact on the effects of ICT on access to information. A unit change in type of extension leads to 21.2% increase in the effects of ICT on access to information. This implies that the effects of ICT on access to information depend on whether respondents were from the public or private sector. Results of the regression analysis also showed a significant statistical relationship between gender, age, competence in the use of ICT, e-readiness, use of ICT, type of extension and effects of ICT on access to information.

CONCLUSION AND RECOMMENDATIONS

The findings of the study revealed that the majority of public and private extension officers were female. The mean age of the two categories of extension officers was less than 45 years. The public extension officers were slightly older than the private officers. Furthermore, more public extension officers were married and have more children compared to private officers. Majority of extension officers are not pursuing higher degrees and public extension officers have more years of job experience. Regular in-service training for the public officers can bridge educational gap between public and private extension officers. The authorities should also put in place effective plans to improve the ICT infrastructure in the country. It is also recommended that collaborations between public and private extension be strengthened, since private extension service is more organized than the public, this will help the use of ICT in the development programmes in the country. Lesotho may not be ready for a full-fledged private extension due to financial implication this will have on the poor rural farmers.

REFERENCES

- Agwu AE, Uche-Mba UC, Akinagbe OM (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.
- Amriah B, Ratnawat IY, Suryandari HA, Kaseh AB, Hamzah J (2014). Women and liveability – Best practices of empowerment from Lesotho. *Malaysian J. Soc. and Space* 10 issue7 (60 – 69) 60
- Themed issue on women, liveability and empowerment in Sub-Saharan Africa © 2014, ISSN 2180-2491
- Central Intelligence Agency fact book (2015). www.cia.gov/library/publication/th Accessed January 5, 2016.
- Ezeh Ann N (2013). Extension agents' access and utilization of information and communication technology (ICT) in extension

- service delivery in South East Nigeria. *Journal of Agricultural Extension*, 5(11), 266-276.
- International Telecommunication Union (2013). *Women and Information Communication Technology in Tunisia*, Country focus, ITU News.
- Mabe LK, Oladele OI (2012). Awareness level of use of Information Communication Technologies tools among Extension officers in the North-West Province, South Africa. *Life Science Journal*, 9(3), 57-62.
- Maphephe J, Balkaran R, Thakur S (2014). Impact of Information and communication technology on direct parliament debates and security of the future laws of mountain kingdom of Lesotho, *Computing Information Systems Development Informatics and Allied Research*, 5(3):29-44.
- Mokotjo W, Kalusopa T (2010). Evaluation of the agricultural information service (AIS) in Lesotho. *International journal of information management*, 30(4), 350-356. Authority of Sri Lanka. *Tropical Agricultural Research* vol 25 (4) 460-475.
- Thakur D, Chander M, Sinha SK (2017). A scale to Measure Attitude of Farmers towards Social Media Use in Agricultural Extension: Indian J. Extension Edu. 17 (3): 10-15.
- The Lesotho Review (2015). An Overview of The Kingdom of Lesotho's Economy.cc Available online www.lesothoreview.com/agriculture-2015.php. Wade publications. Accessed 23/10/2016.
- Vincent K, Cull T (2013). "Ten Seeds" How Mobiles Have Contributed to Development in Women-led Farming Cooperatives in Lesotho. *Information Technology and International Development* Vol. 9 No. 1 pp 37-48.