

# Use of ICTs in Agricultural Extension Services, Gezira State, Sudan

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**Abstract** – This study attempts to investigate the use of ICT in agricultural extension services, Gezira State, Sudan. Field survey was used to collect data from 100 extension officers in the Gezira State in 2014/2015 growing season using the full count method. The collected data were statistically analyzed and interpreted using percentage, frequency distribution and chi-square test. The results showed that there are many constraints facing the use of ICTs in agricultural extension services in the State. It can be concluded that the majority of agricultural extension services of Gezira State, Sudan are still depending on the use of traditional ICTs in its services given to beneficiaries. Thus, The authors recommend that more efforts should be exerted to train extension officers and beneficiaries on the use of modern ICTs and the constraints which are facing the use of ICTs in the agricultural extension services in the State should be solved by all concerned partners.

**Keywords** – Information and Communication Technologies (ICTs), Extension Services, Gezira State Sudan.

## I. INTRODUCTION

Information and communication technologies (ICTs) have promising future to transform agricultural sectors and economic growth of developing countries. Information and communication technologies (ICTs) can be defined as an omnibus term that encompasses computer and telecommunication technology. They are a technologies that can be used in producing, organizing and distributing information[1].

In the majority of African countries agricultural extension services are none-existence, weak or unsatisfactory [2]. In Sudan as in most developing countries ministry-based agricultural extension services are adopted and established after the Second World War as part of American Aid for developing countries in 1959. Therefore agricultural extension services are still depend largely on the use of traditional communication methods in the delivery of these services to extension clientele. Using traditional communication methods, extension officers cannot reach all the targeted clientele because many constaining factors can facing them such as long distance, bad roads, poor communication infrastructure in most rural area in the country, frequent transfer of extension offices from post to post, low payment (salary) , low financial support in addition to high farmers- extension officer ratio (3000:1). In the majority of developing countries there are few extension officers to serve many farmers, for example in Kenya the ratio of farmers to extension officer is 753:1[3].

The emergence of new agricultural development paradigms has led to challenging the conventional methods of delivering important services to audience and the transformation of traditional societies into knowledge societies [4]. The use of information and communication technology (ICT) in agricultural extension and rural development has significantly increased in many countries where it has provided a medium to adequate access to agricultural information [5].

Information and communication technology (ICTs) can play a key role in increasing agricultural production, poverty alleviation, education and health of rural people. Therefore for Africa continent ICTs can be seen as an important component of African agricultural development. They can be used as modern tools in the provision of needed information, knowledge and skills for improving agricultural productivity and rural incomes of African countries..

Agricultural extension and advisory services organizations can help rural people to use these ICTs effectively that in turn will lead to increase their production efficiency, enhance food security and better standard of living. The effective agricultural extension work rely on extension messages (information) reaching many farmers and farmer's problems reaching extension agents quickly and regularly[6]. The main objective of this study was to investigate the Use of ICTs in agricultural extension services, Gezira State, Sudan.

## II. MATERIALS AND METHOD

This study was conducted in the Gezira State, Sudan. The total number of extension officers in the State for 2014/2015 growing season was estimated to be 100 using the full count method. All the population was used to determine the use of ICTs in agricultural extension services, in the State. A questionnaire consisting of four questions was constructed and the personal interview technique was used to administer the questionnaire. The collected data were statistically analyzed and interpreted using percentage and frequency distribution and chi-square test. chi square is given by:

$$\chi^2 = \sum_{r=1}^R \sum_{c=1}^C (O_{rc} - E_{rc})^2 / E_{rc}$$

With degrees of freedom ( $\nu$ ) given by (R-1) (C-1), where:

R: Rows of the contingency table

C: Columns of the contingency table

$O_{rc}$  : Observed frequency in row (r) and column (c)

$E_{rc}$  : Expected frequency in row (r) and column (c)

### III. RESULTS AND DISCUSSION

#### *Socioeconomic profile of extension officers*

##### *Qualifications:*

Educational level of extension offices contributes directly to job performance and impact of extension work with rural people. Education level of extension officers is one of the most serious problems of extension in many countries as shown in the literature; therefore the success of extension services depends mainly upon selection of qualified and motivated extension officers. The results revealed that the majority of extension officers (93%) reported that they are bachelor holders, compared to (02%) of them reported that they are diploma holders and the rest of them (05%) reported that they are MSc holders (Table 1)

Table 1: Percentage distribution of extension officers according to their qualifications

Qualifications	Frequency	%
1- Diploma	02	02
2- BSc	93	93
3-MSc	05	05
Total	100	100

##### *Sex ratio:*

As mentioned in the literature the adopted agricultural extension approach should have gender sensitivity to keep suitable sex ratio among extension officers in order to cover the women farmers at farm level. Regarding values, norms, religion and traditions of rural people in Sudan extension organizations should recognize and respect the gender issue in their field staff. The results indicate that the majority of extension officers (75%) are females compared to (25%) of them are men (Table 2)

Table 2: Percentage distribution of extension officers according to their sex

Qualifications	Frequency	%
1- Male	25	25
2- Female	75	75
Total	100	100

##### *Kind of ICTs used:*

The role of ICTs in improving agricultural extension communication with beneficiaries to share information, skills, experiences and other purposes of communication

was found to be the backbone of successful agricultural extension services that in turn will lead to the targeted agricultural development. The results showed the following (table 3):

- 1- (90%,98%,40%,80%,70%) of extension officers used mobile phone to transfer: information on crop production, problem solving practices, market access, extension meetings and other extension services respectively to their audience.
- 2- All extension officers did not use the e-mail in their services mentioned above given to their audience.
- 3- (00.00%,00.00%,00.00%,) of extension officers did not use the computer projector in their services mentioned above given to their audience respectively while (78%) of them used the computer projector in their meetings with their audience such as workshops, conferences, training sessions and forums.
- 4- (95%,100%,55%) of extension officers used the agricultural extension TV programmes to transfer: information on crop production, problem solving practices and extension meetings respectively to their audience. While (00.00%,00.00%) of them did not use the agricultural extension TV programmes to transfer: information on market access and other extension services respectively to their audience.
- 5- (98%, 100%, 67 %,) of extension officers used the agricultural extension radio programmes to transfer: information on crop production, problem solving practices and extension meetings respectively to their audience. While (00.00%, 00.00%) of them did not use the agricultural extension radio programmes to transfer: information on market access and other extension services respectively to their audience.
- 6- All extension officers (100%) did not use the agricultural extension web sites in their services mentioned above given to their audience.
- 7- All extension officers(100%) did not use the whatsapp in their services mentioned above given to their audience.
- 8- All extension officers(100%) did not use the C.D Rom in their services mentioned above given to their audience.
- 9- All extension officers(100%) did not use the flash drive in their services mentioned above given to their audience.
- 10- All extension officers(100%) did not use the video camera in their services mentioned above given to their audience.

Table 3: Percentage distribution of kind of ICTs used in agricultural extension services:

Kind of ICTs used	Purpose for use									
	Information on crop production		Problem solving practices		Market access		Extension meetings and teaching methods		Other extension services	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%	Frequency	%
1-Mobile phone	90	90	98	98	40	40	80	80	70	70
2- E-mail	00	00	00	00	00		00	00	00	00
3-Computer projector	00	00	00	00	00		78	78	00	00
4- TV	95	95	100	100	00	00	55	55	00	00
5- Radio	98	98	100	100	00	00	67	67	00	00

6- Web sites	00	00	00	00	00	00	00	00	00	00
7-Whatsapp (smart phone)	00	00	00	00	00	00	00	00	00	00
8- C.D Rom	00	00	00	00	00	00	00	00	00	00
9- Flash drive	00	00	00	00	00	00	00	00	00	00
10-Video camera	00	00	00	00	00	00	00	00	00	00

### *Constraints facing use of ICTs in agricultural extension services in Gezira State:*

There are many constraints facing the use of ICT in agricultural extension services in Gezira State. The results showed the following (table IV):

1- The majority of extension officers in Gezira State (73%) reported that they have no smart mobile phones because of high price of them in Sudan and/or lack of them in all agricultural extension complexes in the State.

2- The majority of extension officers in Gezira State (94%) reported that they lack technical know-how which can help them to get more benefits from ICTs if they are trained in the proper use of them.

3- All extension officers in Gezira State (100%) reported that the State lacks internet centres affiliated to Ministry of Agriculture in the villages which can provide information services with reasonable prices for farmers.

4- The majority of extension officers in Gezira State (97%) reported that the State Lacks internet cafes in the villages which can provide information services with commercial prices for farmers.

5- The majority of extension officers in Gezira State (99%) reported that ICTs have High cost in thier buying and usage.

6- The majority of extension officers in Gezira State (65%) reported that they have no personal computers ( lap top device) because of high price of them in Sudan and/or lack of them in all agricultural extension complexes in the State.

7- The majority of extension officers in Gezira State (98%) reported that the State lacks good National Agricultural Information System. This may be due to weak linkages between research, education and extension institutions in the State which can affect the National Agricultural Technology System and limit its contribution to Sudan agricultural development. This result agrees with the result carried out in (2008) : the Sudan Agricultural Information System is facing several challenges, which are also affecting other information and knowledge systems in the country. Overall, existing organizations and their resources are inadequate for the country's needs. This is further compounded by the fact that there is no coordination in the management and provision of information, and this brings with it certain weakness in the system, and issues such as complete neglect of certain areas of agricultural knowledge, fragmentation of information resources, inadequacy of the services provided, and costly duplication of information materials and services [7].

Table IV: Percentage distribution of extension officers according to constraints facing their using of ICTs in agricultural extension services

Constraints	Frequency	%
1- Lack of smart mobile phone	73	73
2-Lack of technical know-how	94	94
3- Lack of internet centres of Ministry of Agriculture in the villages	100	100
4- Lack of internet cafes in the villages	97	97
5- High cost of using ICT	99	99
6- Lack of personal computer (lap top)	65	65
7- Lack of good NAIS	98	98

### *Chi-square test:-*

Chi-square test was used to determine the association between constraints facing the kind of ICTs and purposes for which they were used in agricultural extension services in Gezira State. The results revealed the following (table V):-

1- There was significant association between the lack of smart mobile phones and purposes for which they were used in agricultural extension services.

2- There was significant association between the lack of technical know-how and purposes for which ICTs were used in agricultural extension services.

3- There was significant association between the lack of internet centres of Ministry of Agriculture in the villages and purposes for which they were used in agricultural extension services.

4- There was significant association between the lack of internet cafes in +the villages and purposes for which they were used in agricultural extension services.

5- There was significant association between the high cost of using ICTs and purposes for which they were used in agricultural extension services.

6- There was significant association between the lack of personal computers (lap tops) and purposes for which they were used in agricultural extension services.

7- There was significant association between the lack of good NAIS and purposes for which it was used in agricultural extension services.

8- There was no significant association between the rest of ICTs and purposes for which they were used in agricultural extension services mentioned in table 3.

Table V. Chi-square test to test the association between constraints facing the use of ICTs in agricultural extension services and purposes for which they used

Constrains	Purpose for use					Significance
	Information on crop production	Problem solving practices	Market access	Extension meetings and teaching methods	Other extension services	
	Frequency	Frequency	Frequency	Frequency	Frequency	
1- Lack of smart phone (whatsapp)	73 00	98 73	40 73	80 73	70 73	0.00
2-Lack of technical know-how	00 00	00 00	00 00	00 00	00 00	0.00
3- Lack of internet centres of Ministry of Agriculture in the villages	00 100	00 00	00 100	78 100	00 100	0.00
4- Lack of internet cafes in the villages	95 97	100 97	00 97	55 97	00 97	0.00
5- High cost of using ICT	98 99	100 99	00 99	67 99	00 99	0.00
6- Lack of personal computer (lap top)	00 65	00 65	00 65	00 65	00 65	0.00
7- Lack of good NAIS	00 98		00 98		00 98	0.00

Significance level 0.05 or less

Generally the results obtained are in agreement with those reported in (2010) : the growth of ICT in developing countries offers a new technology and new opportunities for accessing information in poor countries. One of the mechanisms is sharing information via agricultural extension, which has long been plagued with problems related to scale, sustainability, relevance and responsiveness. There are various pilot programmes in India, Bangladesh and East Africa tried these new approaches. But like traditional agricultural extension, ICT-based agricultural extension risks becoming a fad and with limited impact on knowledge, adoption and welfare of poor households[8]. Similar results were reported in (2012) : in the Gezira State, Sudan the majority of vegetable farmers still depend on the use of mobile phone and the traditional ICTs (radio and TV) only to obtain various agricultural extension services and the constraints which facing their use of ICTs led to this unfavorable situation[9]. Also similar results were carried out in (2013) : in South East Nigeria radio and television followed by phone were the most accessed and utilized ICT among the extension officers, however the extent of access and utilization of contemporary ICTs such as internet is still very low[10].

The results of this study are not in line with the results reported in(2013) : in Tanzania the introduced framework for ICT mediated extension services has been tested through pilot project and found to be efficient and effective in complementing the conventional extension services by reaching many farmers with the scare resources available in the surveyed district.[3]

#### IV. CONCLUSION

From this study we can conclude that the majority of agricultural extension services of Gezira State, Sudan are still depending on the use of traditional ICTS in it's srevics given to beneficiaries.

#### RECOMMENDATIONS

The authors recommend the following:

- 1- More efforts should be exerted to train extension officers and beneficiaries on the use of modern ICTs.
- 2- The constraints which are facing the use of ICTs in th agricultural extension services in the State should be solved by all concerned partners .

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