

**Challenges facing research institutions in using information and communication technologies to disseminate agricultural information to farmers in Gezira State, Sudan**

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**Abstract**

In this study the challenges of effective use of ICTs to disseminate agricultural information were investigated. The study also sought to determine whether the extent of ICTs usage influenced the quality, timeliness and usefulness of disseminated agricultural information. The research additionally sought to identify socio-economic factors as well as cultural and technical constraints affecting the use of ICTs in the dissemination of agricultural information. The study generated information that can be used by stakeholders to make appropriate policy decisions involving the use of ICTs. The results indicated that socio-economic factors that influenced the use of ICTs included gender, educational level, income and farm size. The findings further indicated that technical factors such as software packages, limited skilled staff and technicians, few ICTs centres and methods of dissemination also influenced the use of ICTs. In addition cultural factors such as beliefs, moral values and religion also influenced the use of ICTs. Among researchers, the most popular methods of dissemination of agricultural information was print media (30%) followed by radio (20%) and TV (15%) while for farmers the most popular methods to access to agricultural information was radio (21.9%) followed by print media (15.33%) and TV (14.6%).

**Key words:** Agricultural information, challenges, dissemination, ICTs, Sudan

**Résumé**

Dans cette étude, les défis de l'utilisation efficace des TIC pour diffuser l'information agricole ont été étudiés. L'étude a également cherché à déterminer si l'ampleur de l'utilisation des TIC influence la qualité, la rapidité et l'utilité de l'information agricole diffusée. La recherche en outre a cherché à identifier les facteurs socio-économiques ainsi que les contraintes culturelles et techniques qui affectent l'utilisation des TIC dans la diffusion de l'information agricole. L'étude a généré des informations qui peuvent être utilisées par les intervenants pour

prendre des décisions appropriées concernant l'utilisation des TIC. Les résultats ont indiqué que les facteurs socio-économiques qui ont influé sur l'utilisation des TIC comprennent le genre, le niveau d'instruction, le revenu et la taille des exploitations. Les conclusions en outre ont indiqué que des facteurs techniques tels que les logiciels, le personnel et des techniciens qualifiés limités, peu de centres de TIC et les méthodes de diffusion aussi ont influencé l'utilisation des TIC. En plus des facteurs culturels tels que les croyances, les valeurs morales et la religion ont aussi influencé l'utilisation des TIC. Parmi les chercheurs, la méthode la plus populaire de diffusion de l'information agricole a été la presse écrite (30%), suivie par la radio (20%) et la télévision (15%), tandis que pour les agriculteurs la méthode la plus populaire pour accéder à l'information agricole a été la radio (21,9%) suivie par la presse écrite (15,33%) et la télévision (14,6%).

Mots clés: l'information agricole, défis, diffusion, TIC, Soudan

## **Background**

Agriculture contributes 48% of Sudan's gross domestic product, generates about 85% of non-oil foreign exchange earnings, provides raw materials for agriculture based industries and is the largest source of employment (El-Siddig and Musa, 2008). Agricultural research in Sudan started in 1902 to exploit the possibility of growing cotton under irrigation in the North and under rainfed conditions in the South. It expanded very rapidly to include research activities on different crops and in different ecological zones. Most of the research in Sudan is carried out by Agricultural Research Corporation (ARC) of the Ministry of Agriculture, and the Animal Resources Research Corporation (ARRC) of the Ministry of Animal Resources. Little is carried out by the Institutes of Higher Education such as faculties and colleges of agriculture at the Universities of Khartoum, Gezira and Juba (Ahmed, 2003).

## **Literature Summary**

The Sudan agricultural information system is facing several challenges, which are also affecting other information and knowledge systems in the country. Overall, the 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. 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 (El-Siddig and Musa, 2008).

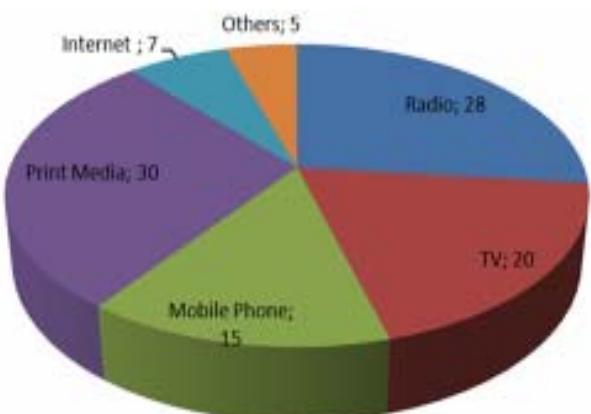
In spite of the promising efforts and policies made by the government and other parties several constraints remain (Fatima, 2009). Outreach to rural and remote areas still pose a considerable challenge. Poverty, lack of resources and political unrest deprioritize ICT for basic needs in most areas of Sudan. Political unrest and civil war also impeded nationwide implementation. Skilled and trained staffs that are well acquainted with ICT tools are very scarce tending to prefer the private sector over government positions (Ghobrial and Musa, 2006). Financing and donor interest in Sudan remains limited greatly affected by embargoes against Sudan. Between rural and urban areas, especially in relation to computer literacy, accesses to telecommunication infrastructure nationwide remain alarmingly low and Arabic electronic content greatly lags behind other communication means (Ghobrial and Musa, 2006). Educational material and curriculum need to be restructured and rebuilt to include materials that meet the needs of a modern society. Political instability in Sudan is a great hurdle that impedes the development process and female participation in public life, education, and in general workforce particular remains fairly low due to longstanding cultural attitudes.

### **Study Description**

The study was conducted in Gezira State which is the most agriculturally productive State in the Sudan. It lies between the Blue Nile and the White Nile rivers. It is bordered by Khartoum State in the North, Gadarif State in the East, White Nile State in the West and Sennar State in the South. It lies in the rich Savanna region between latitude 13-15.2° N and longitude 32.5 – 34° E. The area has a hot dry summer from April to June with daily mean temperature between 32- 42°C and mean relative humidity of 20%. The rainy season starts in late June and ends in October. Winter is cold and dry and occurs during December - February with daily mean temperature between 15-21°C, and mean relative humidity of 30% (Sudan Meteorological Services, 2005).

### **Results**

Figure 1 shows the ICTs that are used to disseminate agricultural information by researchers in Gezira State to include: Radio, TV, Mobile Phone, Print Media, Internet and others. The highest number (30%) of researchers are using print media to disseminate the agricultural information while 20% percent of researchers are using Radio, 20% are using TV, 15% are using



**Figure 1. ICTs use in dissemination of Agricultural information in Gezira State, Sudan.**

Mobile Phones and 7% are using the Internet. A small percent (5%) of researchers are using other methods including field days, Farmers School, Seminars, training, workshops, meeting, extension convoys and personal contact.

Table 1 shows socio-economic factors that influence the use of ICT which include Gender, Educational level, Income and Farm size. Farmers have difficulties in reading and writing because of their low education. Further, weak socio-economic factors (47% of respondents) while 35 % experience income-related challenges, 13% gender and 5% limited farm size.

Table 2 shows cultural factors that influence the use of ICT which include beliefs, moral values, religion and others. Sixty three percent of researchers indicated that farmers beliefs related to traditional planting methods negatively influenced their use of ICT. Eighteen percent of researchers noted that farmer's religious differences hinder the use of ICT in disseminating in agricultural information. Four percent of the researchers reported that moral values also hindered the use of ICT in disseminating agricultural information. Thirteen percent of researchers perceive other challenges such as lack of opportunities for farmers to acquire appropriate knowledge, availability and accessibility to ICT devices like radio and TV programs in most cases that are busy with political and other government related activities, and lack of links with people responsible for technology transfer.

Table 3 shows technical factors that affect the use of ICTs among researchers which includes software packages, limited

**Table 1. Socio-economic factors that influence the use of ICT as perceived by researchers.**

Items	Frequency	Percent
Gender	8	13
Education level	28	47
Income	21	35
Farm Size	3	5
Total	60	100

**Table 2. Cultural factors that influence use of ICT as perceived by researchers.**

Items	Frequency	Percent	Valid percent
Beliefs	14	46.7	63.6
Moral values	1	3.3	4.5
Religion	4	13.3	18.2
Other challenges	3	10.0	13.6
Sub-total	22	73.3	100.0
Missing value	8	26.7	
Total	30	100.0	

**Table 3. Technical factors that influence use of ICT as perceived by researchers.**

Items	Frequency	Percent
Packages	11	13
Skilled staff and technicians	46	53
ICT centers	11	13
Methods of dissemination	18	21
Total	86	100

**Table 4. ICTs suggested by researchers for use in dissemination of agricultural information.**

Items	Frequency	Percent
Radio	15	38
TV	9	23
Mobile Phone	1	3
Print Media	3	8
Specify ) Other)	12	30
Total	40	100

skilled staff and technicians, few ICT centres and methods of dissemination. Fifty three percent of researchers mentioned that there is lack of skilled staff and technicians while 21% indicated that methods of dissemination used also hinder the use of ICT. Lack of /or inappropriate ICTs centres was indicated by 13% of the respondent. The remaining 13% of the sampled researchers noted that dissemination of the information was constrained by software packages.

Table 4 shows the appropriate ICTs suggested by researchers which include Radio, TV, Mobile Phone, Print Media and others. Thirty eight percent of researchers prefer Radio as ICT for dissemination while 30% prefer others, 23% suggested use of TV, 8% suggested print media and 3% preferred the mobile phone.

Figure 2 shows the ICTs that are used for accessing agricultural information by farmers in Gezira State which included Radio, TV, Internet, Mobile Phone, Print Media and others. While 21.9% of farmers used radio, 15.33% of farmers used Print media, 14.6% of farmers used TV, 10.22% used mobile phone and 3.28% internet. A high percentage (34.67%) of farmers obtained information from other sources such as friends, extension staff, agro chemical companies and Agricultural Research Corporation stations.

Table 5, 6, 7 show the challenges facing farmers when accessing agricultural information. Table 5 shows the socio-economic challenges facing farmers in accessing agricultural information which included educational level, gender, farm size and income. Sixty four percent of farmers faced other challenges such as funding, limited irrigation and limited access to credit facilities. However, 21.64% of farmers were low income earners thus faced with financial problems. Also, 11.19% of farmers had low education level thus they had difficulties in reading and writing, 2.24% of farmers had small farm sizes which were unsuitable for adopting some of the technologies. A small number (0.75%) of the farmers face gender inequality in accessing agricultural information.

Table 6 shows the cultural factors facing farmers in accessing agricultural information. The cultural factors include beliefs, laws and religion. Eighty five percent of farmers face other challenges other than cultural constraints while 8.33% of farmers are challenged by certain laws, 5% have strong belief that the

traditional way of doing things is the best. Less than one percent of the farmers were unwilling to take up information disseminated by Christians and vice versa.

Table 7 shows technical constraints farmers face in accessing agricultural information which included: skilled staff, ICTs centres, methods of dissemination and packaging. Seventeen percent of farmers indicated that there was limited access to ICTs centres. There are only a few ICT centres such as TV stations and radio stations, in Gezira State. In addition some

**Table 5. Socio-economic factors influencing access to agricultural information by farmers.**

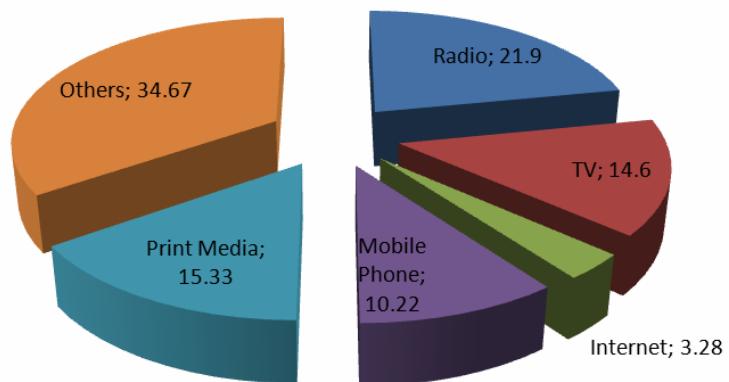
Items	Frequency	Percent
Other challenges	86	64.18
Education level	15	11.19
Gender	1	0.75
Farm size	3	2.24
Income	29	21.64
Total	134	100.00

**Table 6. Cultural factors affecting accessing to agricultural information by farmers.**

Items	Frequency	Percent
Others	102	85.00
Beliefs	6	5.00
Laws	11	8.33
Religion	1	0.83
Total	120	100.00

**Table 7. Technical factors facing farmers in accessing to agricultural information by farmers.**

Items	Frequency	Percent
Other challenges	83	48.82
Skilled staff	13	7.65
ICTs center	29	17.06
Methods of dissemination	23	13.53
Packages	22	12.94
Total	170	100.00



**Figure 2. ICTs use in accessing Agricultural information in Gezira State, Sudan.**

other areas of Gezira State do not access print media. The packaging of the information also poses a challenge to information accessibility. For instance, 12.49% of farmers reported that technologies were packaged in manner that most farmers could not understand. Some farmers (13.53%) also mentioned that the methods of disseminating information were not appropriate. Moreover, 7.65% of farmers mentioned that there were few skilled staff who disseminated agricultural information. The remaining 48.82% did not face any technical challenge.

### **Research Application**

The results of this study will inform to agricultural policy makers to help them improve information dissemination mechanisms to farmers. The results will also be useful to researchers who will gain a better understanding of the challenges facing the use of ICT to disseminate agricultural information. The research results will additionally inform trainers and educators as well as extension agents to help them improve the content of their courses and the methods used for technology transfer activities for farmers in rural communities.

### **Recommendation**

There is need for the Government of Sudan to come up with possible measures to overcome the existing challenges facing the researchers in disseminating agriculture information and farmers in accessing agricultural information. There is also need to scale up the use of ICTs in agricultural information system especially radio since it is the most preferred and accessible media for farmers.

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