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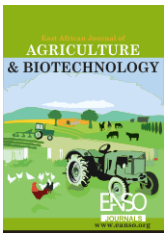

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Original Article

Information Communication Technology Devices for Agricultural Information Dissemination among Smallholder Farmers in Uganda (Rubanda, Mayuge Districts, and Mbarara City)

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ABSTRACT

Agriculture continues to be the main source of livelihood in developing countries and smallholder farming is the most common type of agriculture practice supporting more than 70% of the population. On the other hand, information and communication technology (ICT) is quickly growing as its helping to connect easier and faster; thus, a dire need to harness it in promoting the agricultural sector. This study investigated the Information Communication Technology Devices for Agricultural Information Dissemination among Smallholder Farmers in Uganda (Rubanda, Mayuge Districts, And Mbarara City). The study adopted a cross-sectional research design that comprised a mixed methods approach of quantitative and qualitative. The instrument for this study consisted of structured questionnaires and interviews. More so, available reports and records were explored. The questionnaire was subjected to face and content validity and reliability test. Data collected were analysed using descriptive statistics of frequency counts and percentages. Findings show that the leading types of ICT devices for agricultural information dissemination in Rubanda District, Mayuge District, and Mbarara City were mobile phones and radios. The study recommends that the most important information to farmers should always be disseminated via phone conversation, texting, and radio for broadcast agricultural-related programs in respective local languages.

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INTRODUCTION

Farmer's preference for information dissemination pathways and media is very important in deciding the adoption of technologies and productivity (Muto & Yamano, 2009). Agricultural researchers and extension employees antecedent use typical communication channels to distribute agricultural information to farmers and alternative stakeholders (Burrell & Matovu, 2008). Of recent, there are new ways in which communication is being adopted via ICTs like the web, email, mobile phones, and electronic sources, among others. ICTs are, therefore, innovations that are perceived as new by each agricultural researcher, extension employees, and farmers and are adopted to facilitate the communication and dissemination of agricultural information.

Statement of Problem

The researcher notes that it is not enough to have diverse ICT services/tools to facilitate agricultural communication and dissemination among smallholder farmers in several parts of the globe as well as Uganda, wrong adoption and implementation and oftentimes indifference in the use of the diverse ICT services/tools, without proper consideration of the availability of these devices among the farmers. There is therefore an urgent need to do an assessment of Information Communication Technology Devices for Agricultural Information Dissemination among Smallholder Farmers in Uganda (Rubanda, Mayuge Districts, and Mbarara City).

Research Question

What are the ICT devices commonly used for agricultural information dissemination in Rubanda District, Mayuge District, and Mbarara City?

LITERATURE REVIEW

Radio

Asingwire & Okello (2011) states that radio is one of the vital ICT in several developing countries and should be included in any discussion concerning what reasonable information the society will need to contribute to achieving any development goals. One of the explanations why radio is commonly excluded from discussions concerning ICTs is as a result that it has been around for a long. Its conventional communication technology maybe not be thought-about to be a part of the new information revolution; nonetheless, it has several characteristics that create it vital in

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providing access to information and a platform for interactivity. Additionally, Oyeyinka & Bello (2013) argues that radio continues to possess very wide penetration, notably in Africa, South America, and elements of Asia. It is well-placed, even in remote areas, to produce and interpret information in an exceedingly relevant manner for its listeners. Even as significantly, local radio stations can give standard agricultural information at a comparatively affordable charge for farmers to participate in discussions concerning the local or world problems that are hindering their development. This has steadily increased over the last 15 years and today almost every household owns a radio set in the developing world.

Mobile Phones

The mobile phone has reduced the gap between traders and farmers and same time farmers directly communicate with consumers and customers to search out the great value of their products (Oluwatusin & Ojo, 2017). Farmers, before progressing to market merely contact one of the best buyers who purchase the product at a higher price value. Within the rural areas of developing countries, mobile phones are spreading day by day, and there have been different organisations that have launched several strategies for agriculture development and to increase production by integrating different technologies in agriculture. Mobile phones have created new business opportunities for poor farmers and have given them access to information concerning the market, health, and weather services in remote areas. The use of mobile phones among farmers has had a positive impact on their financial gain and productivity as a result before travelling they impart with buyers and sell their products at a better value.

Another study was conducted in Ghana where mobile phones were introduced among farmers to communicate with traders and their representatives with the aim of obtaining an early market for their produce and negotiating with customers for high prices. Mobile phone technologies have directly connected farmers and traders with no disturbances and they receive directly sensible costs from brokers and customers. Farmers have another advantage of mobile phones as they do not attend to the market however directly communicate and raise the value of their production. During this context, they save their cash, time, and energy according to Etwire *et al.* (2017).

Okello et al. (2014) studied the results of mobile phones on agriculture product and markets information in Uganda and what farmers get regarding market effectiveness. In 2003 and 2005, mobile phone coverage increased by 10 percent among farmers' likelihood of market participation. Mobile phones were found to be more helpful for increasing the information and merchandise of the crops and this sort of technology has provided an honest profit to farmers who reside in remote areas of the country.

Television

The development of agriculture in developing countries largely depends on the utilisation of knowledge and communication technologies that may connect the various communities of individuals. Radio and TV have contended a vital role in enhancing the capability of farmers by broadcasting different agricultural-related programs. Similarly, TV disseminates scientific and agricultural information among farmers and provides the most recent information with discussions from experts. Within the context of India and Ethiopia, TV plays the most important role as a medium of diffusion of information related to agriculture. It had been shown that farmers would get simple information by looking at agriculture-related programs on TV (Mtega, 2017). Television has produced awareness and information among farmers concerning the use of technologies in farming and it produces such reasonable programs that create interest among those who rely upon media for obtaining information concerning education, health, and agriculture (Wawire *et al.*, 2017).

The study was conducted in Iran and the results indicated that sixty-eight percent of the respondents believed that TV-created agriculture programs provided sensible advantages to farmers. What is more important is that it indicated that the programs ought to be created in their regional languages which may offer sensible profit to farmers. However, eighty-seven percent of the respondents said that 6 pm to 8 pm was the appropriate time for broadcasting agriculture programs as a result of this point most farmers were liberal with watching programs simply and around twenty minutes in

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length on TV and it indicated that in varied situations, connection problems such as bad weather were significant yet TV was one of the foremost vital sources of disseminating agricultural-related information among farmers (Chavula, 2014).
Electronic media have brought revolutionary changes within the lifetime of different communities and principally farmers have gotten a lot to enjoy these technologies like TV. TVs have given new selections to farmers for observation through various agriculture programs on different channels. Farmers select the simplest means for keeping up with one another concerning agriculture information. TV is providing a vital role in shaping attitudes, making interests, and presenting factual information (Mtega, 2021). Several new programs were introduced for awareness of farmers in rural areas of developing countries and from the angle of agriculture, TV producers and administrators ought to create the objectives for the event of agriculture by inventing various programs for the expansion of agriculture (Burrell & Matovu, 2008).

Computers

Internet entry and penetration in Uganda stand at 29.1% of the full populace (Balgobin & Dubus, 2022) and at the same time in rural regions of Kenya, 80% of the populace have no internet connection, and the rest 20% trek long distances to the closest domestic cities to search for internet connectivity through cyber net cafes (Mburu, 2013). According to the communications commission of Kenya (CCK), much less than 3 percent of the populace is connected to broadband services, with over ninety percent of the 14 million internet customers getting access to the net through their cellular telephones than computer systems. Different governments in SSA have lately eliminated the taxes on computer systems and their add-ons and advocated subsidies through different companions to inspire the populace to have extra get entry to them. It is predicted that agricultural libraries and data facilities will take gain and undertake suitable strategies inside the provision of agricultural data and cyber extension needs to be added to the use of online networks, computer-aided conversation and data generation, surfing of websites, and familiarising farmers with virtual interactive multimedia to facilitate the switch of generation for better farm activities and productiveness worldwide (Rao *et al.,* n.d.). Computers are primary devices in precision agriculture that target designing structures primarily based on agricultural operational sites aiming at gathering and processing data on soil or crop requirements by use of robots, unmanned aerial vehicles, and satellite imagery (Saddik *et al.,* 2022)

METHODOLOGY

The study adopted a cross-sectional research design that comprised a mixed methods approach of quantitative and qualitative. The target population of this study comprised 190,998 farmers in the Rubanda District, Mayuge District, and Mbarara City and 400 farmers were randomly selected, whereby 374 responses were obtained and made to participate in the study. The instrument for this study consisted of structured questionnaires. More so, available reports and records were explored. The questionnaire was subjected to face and content validity and reliability test. Data collected were analysed using descriptive statistics of frequency counts and percentages. Copies of the questionnaire were distributed to them and collected for analysis after they were filled.

RESULTS AND DISCUSSIONS OF FINDINGS

Table 1 reveals the ICT devices commonly used for agricultural information dissemination in Rubanda District, Mayuge District, and Mbarara City based on their percentage. The majority of the respondents (88.8%) had personal mobile phones, 85.6% had personal radios, 48.7% had personal television, and 17.4% had laptops. This implies that personal mobile phones, personal radio, and personal television are the most commonly used ICT devices for agricultural information dissemination among farmers in Rubanda, Mayuge Districts, and Mbarara city. This conforms with Singh (2006) who indicated that radio and television programs had helped farmers in India to receive support for improved crop production, processing, packaging, and selling. Similarly, it conquers with (Asingwire and Okello, 2011) who stated that radio is one of the foremost vital ICT in several developing countries that should be included in any discussion concerning what reasonable agricultural

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information the society will need to contribute to achieving any development goals.

Table 1: The ICT devices commonly used for agricultural information dissemination in Rubanda District, Mayuge District, and Mbarara City

ICT device	Personal		Borrowed		Given by good Samaritan		Do not Have	
	f	%	f	%	f	%	f	%
Radio	320	85.6	1	0.3	3	0.8	50	13.4
Television	182	48.7	18	4.8	7	1.9	167	44.7
Mobile Phone	336	88.8	29	7.8	2	0.5	7	1.7
Computer	65	17.4	31	8.3	10	2.7	268	71.7

Source: Field data, 2022

ICT devices, especially radios and phones have increasingly become cheaper in the 21st century given governments' investments in rural development and enhancement of satellite, internet, and frequency modulation (FM) waves and rural electrification, which makes personal ownership very easy. This finding is also complemented by that from the majority of the Key Informant Interviews who said that they used radios and mobile phones to access and disseminate agricultural information. One of the Key Informants in the Mayuge district said while explaining how ICTs have helped him to reach farmers while saving time and contacting many farmers within the shortest period of time.

CONCLUSION AND RECOMMENDATIONS

Based on the findings of this study, mobile phones and radios are the most commonly used ICT devices for agricultural information dissemination in Rubanda district, Mayuge district, and Mbarara city. It is recommended that the most important information to farmers should always be disseminated via phone conversation, texting, and radio broadcast.

Developing and promoting open-access agricultural knowledge platforms: Governments, academia, and knowledge platform providers should facilitate the development and deployment of open-access knowledge platforms across the continent. To make content and technologies more accessible to farmers and other stakeholders, governments and technology service providers need to promote the localisation of content and technologies.

In order to strengthen the digital literacy skills of value chain actors, governments, academia, and other actors need to increase investments in digital awareness and digital skills programs to build the capacity of digital users of these potential digital technologies. To foster the development and consumption of indigenous digital technologies, Governments and academia need to invest in developing and promoting indigenous agricultural technology innovations to meet the unique needs of their ecosystems.

Boost internet accessibility and coverage across the continent: To make the internet and other telecom services available to the rural populace, especially farmers, the government and telecom operators need to expand network coverage across the continent. Increasing investment in power generation and distribution and cutting taxes on renewable energy sources like solar will help governments across the continent address the issue of electricity access and make these sources cheaper for farmers and other value chain participants.

Encouraging the production of ICT equipment on the continent: Since the majority of rural farmers still face high access costs for gadgets like laptops and phones, governments and the private sector should encourage the construction of electronic manufacturing firms. Integrate E-agriculture and electronic device management into the educational curriculum: The promotion of agricultural digitisation will result in the generation of knowledge so it is necessary to incorporate these topics into the curriculum at all levels of official and informal education on the continent.

Encourage the cross-border exchange of infrastructure and resources, such as data centres and specialised time and knowledge on the continent that must encourage the sharing of data centres and other digital technology infrastructure to reduce capital expenditures and hasten the creation of high-value digital services. Promote equitable

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access to digital technology for all groups, particularly for young people, women, and people with disabilities: To take advantage of the demographic dividends on the continent, governments, academics, and technology developers must encourage the development of inclusive digital technologies.

CONTRIBUTIONS TO KNOWLEDGE

The findings of this study highlighted the effectiveness of ICTs in diffusive agricultural information among smallholder farmers. This will modify farmers and extension employees to be in a very position to grasp the importance of those ICTs in the extension system and thus be able to utilise their potential to enhance different extension and information services.

Declaration Of Conflict of Interest

The authors do hereby declare no conflict of interest for this research and publication.

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