



## East African Journal of Agriculture and Biotechnology

ejab.eanso.org

Volume 5, Issue 1, 2022

p-ISSN: 2707-4293 | e-ISSN: 2707-4307

Title DOI: <https://doi.org/10.37284/2707-4307>

**ENSO**

EAST AFRICAN  
NATURE &  
SCIENCE  
ORGANIZATION

Original Article

## The Use of Information and Communication Technology (ICT) and the Challenges Faced by Ugandan Smallholder Farmers. Review Article.

Willbroad Byamukama<sup>1\*</sup>, Rebecca Kalibwani<sup>1</sup>, & Businge Phelix Mbabazi<sup>2</sup>

<sup>1</sup> Bishop Stuart University, P. O. Box 09, Mbarara, Uganda.

<sup>2</sup> Kabale University, P. O. Box 317, Kabale - Uganda.

\* Author for Correspondence Email: [willbroad2016@gmail.com](mailto:willbroad2016@gmail.com).

Article DOI: <https://doi.org/10.37284/ejab.5.1.642>

**Date Published:** ABSTRACT

26 April 2022 The influence of ICT use on smallholder farmers in rural farming is examined in this article, as well as the obstacles that ICT use presents. The paper reviews that ICT plays a very important role in the dissemination of improved service technologies to farmers. The review stresses that ICTs are often used as an associate degree economical tool to induce non-progressive farmers to connect to extension information and to inform them adopt technology quicker. On the impacts of ICT on farmers, it is absolute that it considerably exaggerates agricultural development by serving to farmers to access relevant information through ICT and creates awareness of the market system among farmers and advert of the products and services. Likewise, the review known as some constraints by farmers within the course of the utilization the use of ICT embeds inadequate ICT facilities and personnel in rural areas, unstable Power provide in rural communities and farmers' perception of the ICT skills. The solutions to the constraints by farmers within the usage of ICT is the event of the ICT within the reach and data of farmers, supporting farmers in capability building before the utilization of the ICT devices, and steadily provide power in rural communities.

**Keywords:**

Power,  
ICT,  
Usage,  
Farmers,  
Uganda

### APA CITATION

Byamukama, W., Kalibwani, R., & Mbabazi, B. P. (2022). The Use of Information and Communication Technology (ICT) and the Challenges Faced by Ugandan Smallholder Farmers. Review Article. *East African Journal of Agriculture and Biotechnology*, 5(1), 108-113. <https://doi.org/10.37284/ejab.5.1.642>

### CHICAGO CITATION

Byamukama, Willbroad, Rebecca Kalibwani & Businge Phelix Mbabazi. 2022. "The Use of Information and Communication Technology (ICT) and the Challenges Faced by Ugandan Smallholder Farmers. Review Article". *East African Journal of Agriculture and Biotechnology* 5 (1), 108-113. <https://doi.org/10.37284/ejab.5.1.642>.

#### HARVARD CITATION

Byamukama, W., Kalibwani, R., & Mbabazi, B. P. (2022) "The Use of Information and Communication Technology (ICT) and the Challenges Faced by Ugandan Smallholder Farmers. Review Article", *East African Journal of Agriculture and Biotechnology*, 5(1), pp. 108-113. doi: 10.37284/ejab.5.1.642.

#### IEEE CITATION

W. Byamukama, R. Kalibwani, & B. P. Mbabazi "The Use of Information and Communication Technology (ICT) and the Challenges Faced by Ugandan Smallholder Farmers. Review Article", *EJAB*, vol. 5, no. 1, pp. 108-113, Apr. 2022.

#### MLA CITATION

Byamukama, Willbroad, Rebecca Kalibwani & Businge Phelix Mbabazi. "The Use of Information and Communication Technology (ICT) and the Challenges Faced by Ugandan Smallholder Farmers. Review Article". *East African Journal of Agriculture and Biotechnology*, Vol. 5, no. 1, Apr. 2022, pp. 108-113, doi:10.37284/ejab.5.1.642.

## INTRODUCTION

According to a recent World Economic Forum estimate, agriculture provides a living for almost 70% of the African people. As a result, agriculture is a vital sector on the African continent. Agricultural productivity is still low, and food poverty remains a problem (Ayim et al., 2020). As a result, agriculture is a vital sector on the African continent. Despite the good potential for agricultural production in Africa, about 73% of the poor people living in rural areas survive on a dollar each day and about 200 million of the world's hungry people are found within the continent and available statistics suggest that about one third of Africa's population is malnourished. Farm managers learn by creating networks of colleagues and advisers, and so when informal learning processes, in which social networks play a major role, result in innovation (Sousa et al., 2016). In a research done by the World Bank's independent evaluation group found that- (i) Farmers who regularly connect with extension staff are more likely to adopt technology sooner, (ii) It's an incontrovertible fact that the progressive farmers get connected to extension agents faster than other farmers and (iii) The technology that gives returns quickly is accepted quickly and its use is more wide spread (Zyl et al., 2014). If these three observations are taken as facts, modern ICT are often used as an efficient tool to urge non-progressive farmers connected to extension information and to form

them adopt technology faster. ICT plays a crucial role in adoption of technologies that are in an early stage of adoption (Mittal & Mehar, 2012). This is often in line with (Rasouliazar et al., 2011) who stated that the farmers' ability to use information technology should be improved through various education schemes and awareness of the knowledge age of the 21st century.

### Contextual background ICT in agriculture

In a time when farming methods are continuously evolving and modernizing, public extension services in developing countries are sometimes seen as archaic. Government extension organizations are typically bureaucratic, and the services they give may not be able to reach all smallholder farmers, nor will they be able to provide up-to-date and specialized information to satisfy the needs of rural smallholder farmers (Bell & Shabaz, 2018).

The expansion of ICT in developing nations allows users to communicate and receive critical information, especially for individuals and communities that live in remote areas (Aker et al., 2016). However, due to the extremely localized character of agriculture, this all hinges on the affordability of ICT and if the information delivered is customized specifically to distinct situations (Barber et al., 2018); (Bell & Shabaz, 2018).

With reference to agriculture and rural development occupying a crucial place within the economy of Uganda, it's important to identify the power and impact of ICT and the problems faced by the rural farmers within the usage of the ICTs in and the role it plays on agriculture (Mukwaya et al., 2012). This may help in drawing appropriate extension strategies needed for boosting the sector and food productivity.

### Cited related work

This article focuses on the theory of information and communication technology for agricultural development, which asserts that mobile phones are a valuable asset for agricultural and rural development since they provide rural farmers with greater access to information (Martin & Abbott, 2011). According to Ogunniyi & Ojebuyi (2016), employing a mobile phone in agribusiness to gather data for smart decision-making, particularly in buying, selling, and contacting potential clients, would boost agribusiness activities.

Mobile phones, according evidence from research findings published by various academicians, radio, and TV are the foremost important tools of communication which may be accessed by farmers for agricultural related information and knowledge (Olaniyi, 2013; Chhachhar et al., 2014). Rural smallholder farmers have been reported to have a prevalence rate of mobile phones as an ICT tool (Hassan et al., 2018; Okello et al., 2014)

### THE IMPACT OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) ON SMALLHOLDER FARMERS IN RURAL AREAS

In a work published by Gillwald et al. (n.d.), the role and contributions of ICT in the development of agriculture around rural farming communities have been evaluated. The findings also revealed that ICT and agricultural development have a substantial association. This claim is backed by (Ahabyoona et al., 2019) in their findings, which reveal a strong

link between computer and internet use and individual social and economic qualities for agricultural progress. It is also recommended that internet facilities should be made accessible to the agricultural researchers to improve usage and contributions to agricultural development (Sennuga & Oyewole, 2020). This might be accomplished by allowing farmers to communicate information with other farmers and extension agents via websites, which are less expensive than phone calls. Farmers might also use ICT to gain access to vital information at any time, allowing them to collaborate with development organizations and other farmers to create jobs and, as a result, increased agricultural output (Saidu et al., 2017; Abdullah & Samah, 2013) ICT gives timely information on what, when, where, why, and how to produce and sell agricultural products (Kale et al., 2015). Furthermore, ICT-based market information systems have a proven track record for improving the rural livelihoods in middle income earners of developing countries where they have been introduced. These findings are consistent with (De Silva & Ratnadiwakara, 2008) who found that there is likelihood of reductions in business cost with the use of ICT.

Smallholder farmers can also profit from ICT in the following ways:

- Creating awareness of market system among farmers through interactive programs at regular intervals.
- Training farmers on ICT, especially the use of computer and smart phone related services such as internet and apps for online advertisement of goods and services
- Use of local language in ICT media to reach a bigger audience on available marketplaces
- Use telephone-based services (farmers call centres and text messaging content) facilitate the exchange of supply and demand information between farmers and entrepreneurs

- Information and communication technology (ICT) can help improve the effect and performance of agricultural output and, as a result, directly alleviate poverty through credit and financial services (Bhalekar et al., 2015)

### The Constraints Faced by Smallholder Farmers Using ICT

Inadequate ICT facilities and personnel in rural areas due to unsuitable ICT policies, lack of sustainability because most ICT projects were and are project-based, particularly those that address rural areas and their growth are disjointed and uncoordinated (Munyua et al., 2009).

Unstable Power supply in rural communities and the farmers' perception of the ICT skills. This assertion is in line with (Abdullah & Samah, 2013), who suggested that extension workers' perspectives and levels of education, as well as their knowledge, both play a role, the management of the extension program, and the physical conditions of the farmers at all level are critical in agricultural development.

Harmonization of local farming groups' knowledge and language is a problem. This claim is backed by the fact that ICT in agriculture has gotten a lot of attention (Zewge et al., 2015) over the past few years with number of contributions but still there is long ways to go. In addition, there are inadequate knowledge areas in methods, user interface design, and theory in how to develop information system for rural community locations at present.

### CONCLUSION

This article identifies the potential of information and communications technologies (ICT) as well as the hurdles that smallholder farmers in developing countries face (Uganda). The powers and benefits include creating awareness of market system among farmers, training farmers on ICT; especially the use of computer and smart phone related services and use telephone-based services. The hindrances faced include, Unstable Power supply in rural

communities, Farmer's perception of the ICT skills, and problem of harmonization of knowledge and language. While the solutions to the hindrances faced using the ICT will include designing the ICT within the reach and knowledge of farmers, additionally, in rural areas, a steady supply of electricity to power ICT devices. It is supported by the information and communication technology for development theory, which states that mobile phones are an asset for agricultural and rural development because they allow rural farmers to have more access to information (Martin & Abbott, 2011). The literature gives an insight on the need of ICT and its powers in agriculture including the benefits farmers derive while the background and introduction dwells on the need of ICT for wide coverage of innovation in agriculture for smallholder farmers through ICTs that could perhaps be used to reach the 70% of the farming population that live in rural areas.

### REFERENCES

- Abdullah, F. A., & Samah, B. A. (2013). Factors impinging farmers' use of agriculture technology. *Asian Social Science*, 9(3), 120.
- Ahabyoona, F., Lubega, J. T., & Kibukamusoke, M. (2019). Information Communication Technology for enhanced credit facilitation decisions for Agricultural Cooperatives in Uganda. *International Journal of Technology and Management*, 4(1), 22–22.
- Aker, J. C., Ghosh, I., & Burrell, J. (2016). The promise (and pitfalls) of ICT for agriculture initiatives. *Agricultural Economics*, 47(S1), 35–48.
- Ayim, C., Kassahun, A., Tekinerdogan, B., & Addison, C. (2020). Adoption of ICT innovations in the agriculture sector in Africa: A Systematic Literature Review. *ArXiv Preprint ArXiv:2006.13831*.

- Barber, J., Mangnus, E., & Bitzer, V. (2018). Harnessing ICT for agricultural extension. *Europe*, 91(120.6), 31–35.
- Bell, M., & Shabaz, B. (2018). *Information communication technology (ICT) in agricultural extension in Pakistan: Findings and proposed next steps*.
- Bhalekar, P., Ingle, S., & Pathak, K. (2015). The study of some ICT projects in agriculture for rural development of India. *Asian Journal of Computer Science and Information Technology*, 5(1), 5–7.
- Chhachhar, A. R., Qureshi, B., Khushk, G. M., & Ahmed, S. (2014). Impact of information and communication technologies in agriculture development. *Journal of Basic and Applied Scientific Research*, 4(1), 281–288.
- De Silva, H., & Ratnadiwakara, D. (2008). Using ICT to reduce transaction costs in agriculture through better communication: A case-study from Sri Lanka. *LIRNEasia, Colombo, Sri Lanka, Nov*.
- Gillwald, A., Mothobi, O., Ndiwalana, A., & Tusubira, T. (n.d.). *THE STATE OF ICT IN UGANDA*. 36.
- Hassan, B., Unwin, T., & Gardezi, A. (2018). Gender, Mobile, and Mobile Internet| Understanding the Darker Side of ICTs: Gender, Sexual Harassment, and Mobile Devices in Pakistan. *Information Technologies & International Development*, 14, 17.
- Kale, R. B., Rohilla, P. P., Meena, M. S., & Wadkar, S. K. (2015). Information and communication technologies for agricultural knowledge management in India. *J. Glob. Comm*, 8(1), 16–22.
- Martin, B. L., & Abbott, E. (2011). Mobile phones and rural livelihoods: Diffusion, uses, and perceived impacts among farmers in rural Uganda. *Information Technologies & International Development*, 7(4), pp-17.
- Mittal, S., & Mehar, M. (2012). How mobile phones contribute to growth of small farmers? Evidence from India. *Quarterly Journal of International Agriculture*, 51(892-2016–65169), 227–244.
- Mukwaya, P., Bamutaze, Y., Mugarura, S., & Benson, T. (2012). Rural-urban transformation in Uganda. *Journal of African Development*, 14(2), 169–194.
- Munyua, H., Adera, E., & Jensen, M. (2009). Emerging ICTs and Their Potential in Revitalizing Small-Scale Agriculture in Africa. *Agricultural Information Worldwide*, 2(1).
- Ogunniyi, M. D., & Ojebuyi, B. R. (2016). Mobile phone use for agribusiness by farmers in Southwest Nigeria. *Journal of Agricultural Extension*, 20(2), 172–187.
- Okello, J. J., Kirui, O. K., Gitonga, Z. M., Njiraini, G. W., & Nzuma, J. M. (2014). *Determinants of awareness and use ICT-based market information services in developing-country agriculture: The case of smallholder farmers in Kenya*.
- Olaniyi, O. A. (2013). Assessment of utilization of information and communication technologies (ICTs) among poultry farmers in Nigeria: An emerging challenge. *Transnational Journal of Science and Technology*, 3(6), 29–43.
- Rasouliazar, S., Hosseini, S. M., Hosseini, S. J. F., & Mirdamadi, S. M. (2011). The investigation perception of agricultural extension agents about affective factors on effectiveness of agricultural advisory services companies in Iran. *Journal of American Science*, 7(2), 445–451.
- Saidu, A., Clarkson, A. M., Adamu, S. H., Mohammed, M., & Jibo, I. (2017). Application of ICT in agriculture: Opportunities and challenges in developing countries.

*International Journal of Computer Science and Mathematical Theory*, 3(1), 8–18.

Sennuga, S. O., & Oyewole, S. O. (2020). Exploring the Effectiveness of Agricultural Technologies Training among Smallholder Farmers in Sub-Saharan African Communities. *European Journal of Training and Development Studies*, 7(4), 1–15.

Sousa, F., Gian, N., & Home, R. (2016). Information technologies as a tool for agricultural extension and farmer-to-farmer exchange: Mobile-phone video use in Mali... *International Journal of Education and Development Using Information and Communication Technology*, 12(3), 19–36.

Zewge, A., Dittrich, Y., & Bekele, R. (2015). Adapting participatory design to design information system with rural Ethiopian community. *AFRICON 2015*, 1–5.

Zyl, O. V., Alexander, T., Graaf, L. D., & Mukherjee, K. (2014). *ICTs for agriculture in Africa*.