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Short Review Paper

Constraints militating against adoption and utilization of conventional and contemporary ICTs for agro-information retrieval: a short review

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Abstract

Effective and result-oriented communication depends greatly on the channels of dissemination. Smallholder farmers are the backbone of the Nigerian agricultural sector. This group of farmers are mostly located in rural areas, thus, limiting their access to timely information. Utilizing ICTs for agro-information retrieval provide farmers with information regarding new innovation, fertilizers, pests and disease control, credit, weather, potential markets, etc. Carried out in rural parts of Nigeria, this short review seeks to identify the constraints militating against adoption and utilization of conventional and contemporary ICTs for effective agro-information retrieval. Data were obtained through collating relevant research as well as past surveys carried out on the topic. Constraints identified were; inconsistent power supply and low network connectivity, lack of technological expertise in operating ICTs among farmers, inadequate educational background, lack of adequate technological infrastructure and the price of airtime and data charged by network providers.

Keywords: Constraints, adoption, utilization, ICTs, Agro-Information, retrieval, rural farmers.

Introduction

Contributions to the agricultural sector of Nigeria is mostly dependent on small holder farmers, making the sector essential for socio-economic growth. In some developing countries, agriculture is the major source of economic growth, including rural development, poverty alleviation, employment generation, supply of raw materials and ensuring food security of its populace. Rural farmers are often exploited by marketers because they lack sufficient agro-information, especially information related to profitable markets and market pricing[1].

More than two decades now, Africa has gone through rapid growth in the world's digital communication sector[2]. Masuki, Kamugisha, Mowo, Tanui, Tukahirwa, Mogoi, and Adera[3] say that agricultural information is a vital aspect of increasing subsistence farming and linking such to potential markets to improve food security among rural farmers. Agricultural information is a means of boosting production among farmers, access to markets for their produce which is able to transform their livelihood and improve food security.

Retrieval of agricultural information refers to the channel or source through which a message is retrieved. Information retention largely depends on the channel of dissemination. As with dissemination, retrieval adopts major channels such as radio, television, mobile phones, etc. For possible and maximum retention to take place, information reaching farmers must be channeled and retrieved through the right source, especially for information that requires demonstrations. Ayisi and Kozári[4], observes that rural farmers utilize various ICTs for information retrieval based on convenience, affordability, availability, ease of usage among others. ICTs can effectively link farmers to extension, and extension to research institutes and in the same vein, facilitate feedback from farmers back to extension and research institutes.

Adoption and utilization of ICTs among rural farmers are slow as a result of several infrastructural constraints, however, ICTs gives people more communication influence, helps to reduce limitations in communicating over long distance, provide current information for use, educate how to acquire expertise for income creation, assist authorities in managing available resources and wealth creation[5]. Information Communication Technologies (ICTs) are employed to facilitate a multitude of various media which may include use of ICT devices connected to internet as a means transmitting information through mobile phones and other communication channels[6].

Justification of the Adoption and Utilization of ICT for Information Retrieval

In recent times, dissemination of agro-information has been made easy due to the presence of many ICT mediums[7]. The adoption and utilization of ICTs closes the gap of time and distance between farmers and extension agents, hence making it easier for extension agents to relate directly with farmers. One of the roles of agricultural extension agents is to reduce communication barriers between farmers and researchers by

ensuring that farmers get access to accurate and timely agricultural information.

Despite the technological advancement in digital communication there are still limitations in accessing accurate and timely information[8]. According to Bharat[9] there is a general scarcity of pertinent, timely and sufficient information on production practices, farm administration, and cost of agricultural produce, food security assessments and markets for agricultural products that can better the well- being of farmers. Additionally, farmers use ICTs to access right market for their produce[10].

Rural communities utilize available communication channels such as radio, television, and newspapers because it is easily accessible and easy to use. Nomads who occasionally tend to move from one place to another find it difficult to access other sources of information adopt radio as a means of information retrieval[11]. Additionally, mobile phones increase the opportunity of getting access to the people living in rural areas[12]. Richard[13] states that information transmitted through visuals enhance closeness, gives opportunity for difficult demonstrations and innovations.

Agricultural development will experience slow growth if all forms of information dissemination channels are not adopted[14]. This study therefore, seeks to identify constraints militating against adoption and utilization of conventional and contemporary ICTs for effective agricultural information in Southwest Nigeria. Recommendations will be proffered based on the research findings.

Materials and Methods

The study was conducted out in rural areas of Southwest Nigeria. Secondary data were obtained for the study through research papers, books and internet sources.

Concept of Information Communication Technology: Information and Communication Technology (ICT) refers to the improvement of basic communication processes such as message creation, transmission and storage. ICT is an all-inclusive system of computers and digital communication channels[15]. ICTs also refer to the several connected systems used in information dissemination, their usage and the various amenities these systems offer[16]. ICTs can be in the form of television, radio, print, fax, video, mobile phones, computers, internet, email, etc.

Folayan, Ifeoluwa and Joshua[17] list the following as the components of information and communication technology (ICTs): i. Communication channel e.g. (radio, television), ii. Hardware containing information e.g. (computers). iii. Digital communication channels and equipment (internet connection from satellite, to mobile phones).

Classification of Information Communication Technology

Adejo[18] classifies ICT as conventional ICT and contemporary ICT. Radio and Television are examples of conventional ICT, while telephones, computers/internet make up contemporary ICT. According to the author, conventional ICT tools are better suited for rural areas because it is cheap to assemble, easy to use and meets information needs.

Conventional/Traditional ICT: i. Radio: A radio set is a wireless receiver of information. It receives information via radio waves, together with an antenna and converts it to a usable form. Radio effective in sharing information to empower farmers who are side lined and illiterate[19]. Studies have shown that almost all rural farmers have access to radio compared with other types of conventional ICTs. ii. Television set or receiver is a type of information channels that relays information through display of images with speakers connected to produce sound. Television is an important medium for sharing agricultural information[19]. It is an effective medium for information dissemination and retrieval due to its pictorial mode of conveying messages, thus making messages easier to understand. iii. Print media are used to retrieve information from writings, diagrams and pictures. Studies have proved that books and other print media are beneficial for transferring agricultural information to rural communities. Although, illiteracy poses a barrier in understanding written information.

Contemporary/Modern ICT: i. Mobile phones: Mobile phones use radio frequency to make calls, receive calls, send and receive Short Message Services (SMS). Irrespective of social status, age, income status or location, the possession of mobile phones is a necessity, especially in modern communities[20]. ii. Computer/Internet: A computer is a machine that is instructed through programs to carry out series of actions. Internet is basically a form of interconnected networks used to send and receive information. Information gap in rural areas can be reduced or ultimately closed through computer-based ICT devices and connecting networks (internet)[21]. Haruna and Baba[22] posits that internet accessibility and utilization is more effective when various technologies are used.

Constraints to the Use of Information Communication Technologies by Rural Farmers

Frequent power outage and slow internet connection are one of the major challenges of utilizing ICTs among the farmers[10]. Irregular electricity supply in villages is a common problem restricting infrastructural development[20]. Low levels of electricity supply tends to limit the coverage of ICTs and related services to rural areas. For instance, electricity is needed to recharge batteries of mobile phones[23]. Furthermore, television viewing and keeping up with agricultural programmes is limited in rural areas as a result of inconsistent electricity supply[24].

Lack of technological expertise in operating ICTs among farmers limit their usage[25]. Gelb, Maru, Brodgen, Dodsworth, Samii and Pesce[26] notes a demanding requirement to train end users of ICTs so as to meet up with the evolving features of information dissemination through internet. Further, lack of practical exposure is also a challenge faced by local farmers[27], travelling over long distance to seek maintain and repair for ICT tools[5], poor farmers find it difficult to acquire ICTs due to their expensive nature[25].

Manuals and applications that accompany ICTs are written in English language without translations to farmers' native language[28]. This poses a barrier to utilization of ICT by the farmers because a majority of them are illiterates. This reduces the effectiveness of ICT's in meeting information needs of rural farmers because these devices come with manuals and user guidelines to help the user harness the benefits of the device.

A major setback affecting the utilization of ICTs via internet-based media in Southwest Nigeria is the absence of infrastructure to power these technologies. This is a major setback to use of ICTs among most rural farmers. As Ortmann observes[29] commercial farmers in South Africa utilize ICTs in farm administration. Although the use of internet-based services in Southwest Nigeria is increasing, purchasing airtime for data in order to access the internet is expensive and unaffordable by most rural farmers. ICTs are thereby substituted for radio, television and print media due to lack of internet connection.

Another bottleneck tightening accessibility of rural farmers to ICTs is the price of airtime and data charged by network service providers. Most rural farmers are poor; they can neither purchase nor maintain ICTs due to their high initial cost, thereby suppressing its adoption.

According to Aduwa-Ogiegbaen and Iyamu[30], unsuccessful utilization of ICT in Southwest Nigeria are caused by several constraints including; high cost, weak and/or non-existent infrastructure, inadequate expertise, absence of updated software and limited access to the Internet.

Conclusion

For development to occur in the agricultural sector, disseminating agricultural information through ICT is vital. As much as there is constant technological advancement, developing communities such as the one under study still seem to lag behind. This is due to various infrastructural reasons as discussed in the preceding pages. Although modern and traditional ICTs provide immense benefits to its end users, their accessibility is limited. Inconsistent power supply and low network connectivity, absence of technological expertise in operating ICTs among farmers, inadequate educational background, lack of adequate technological infrastructure and the price of airtime and data charged by network providers were the constraints identified.

Rural farmers in Southwest Nigeria will continue to underutilize ICTs if the needed infrastructures are not put in place. To maximize the full potentials of ICTs in the study area, far reaching solutions need to be provided. There is no law which says rural farmers must adapt to a particular source of retrieving information. Different communities need to adopt that which works for them, hence more focus should be placed on the strongest form of ICT that will provide desired results. Furthermore, apart from the constraints discussed in the preceding pages, there is need for more research into farmers' capabilities in utilizing ICTs.

As much as there are justifications to support the use of ICTs in the study area, there are challenges to which recommendations and subsequent solutions need to be proffered.

Recommendations: i. Rural farmers in Southwest Nigeria need to be sensitized on the significance of utilizing ICTs in retrieving agricultural information. This can be achieved through various channels such as; agricultural extension agents and farmer associations. ii. Farmers tend to retain information that is being demonstrated, hence agricultural extension agents need to adopt ICTs in transmitting agricultural related information to rural farmers. As the farmers are being taught via ICTs, they will also learn how to put them to use. Engaging the use of ICTs in teaching rural farmers will also help to conquer the problem of slow adoption and will boost the confidence of farmers in adopting ICTs. iii. For the successful implementation of ICTs to agricultural development, the government need to strengthen their partnership with private sectors to supply ICTs and infrastructure at subsidized rates to rural farmers. iv. Government should also intensify electric power supply to rural areas. Rural farmers can be provided with electric solar panels at a subsidized rate. These measures will ensure farmers have access to timely information from power-generated ICTs.

References

1. Felicia, I.W, and Inioluwa, O.O (2020). Adoption and Utilization of ICT through Farmers.NG Technology in Ondo State, Nigeria. *International Journal of Applied Agricultural Sciences,* 6(1), 7-15.

2. Sanda, H.U, and Kurfi, M.H. (2013). Gender and Information Communication Technologies (ICTS) in Nigeria: Challenges and Prospects. *Global Journal of Human Social Science*, 13(6), Version 1.0.

3. Masuki, K. F. G., Kamugisha, R., Mowo, J. G., Tanui, J., Tukahirwa, J., Mogoi, J., & Adera, E. O. (2010). Role of mobile phones in improving communication and information delivery for agricultural development: Lessons from South Western Uganda. In Workshop at Makerere University, Uganda, pp. 22-23.

4. Nyarko, D. A., & Kozári, J. (2021). Information and communication technologies (ICTs) usage among agricultural extension officers and its impact on extension

delivery in Ghana. *Journal of the Saudi Society of Agricultural Sciences*, 20(3), 164-172.

5. Asian Development Bank. (2004). Building e-Community centres for rural development: Report of the regional workshop, Bali, Indonesia. https://www.adbi.org/files/2004.12.08.cpp.proceedings.building.ecommunity.pdf

6. Tata J.S. (2018). Extension Management in the Information Age. *Journal of Extension,* 28(1).

7. Abhishek, M., Yadav, O.P., Vishakha, Y. and Swatantra, P.S. (2020). Constraints faced by farmers and suggestions for effective utilization of ICT services in agriculture in central UP. *The Pharma Innovation Journal,* 9(2), 121-124.

8. Chisita, C.T. (2013). Knotting and networking agricultural information services through web to create an informed farming community: a case of Zimbabwe. https://comference.ifla.org/ifla78

9. Rohila, A. K., Yadav, K., & Ghanghas, B. S. (2017). Role of Information and communication technology (ICT) in agriculture and extension. *Journal of Applied and Natural Science*, 9(2), 1097-1100.

10. Oyeyinka, R.A. and Bello, R.O. (2013). Farmers Use of ICTs for Marketing Information Outlets in Oyo State, Nigeria. *Journal of Agricultural Science,* 5(11), 150-158.

11. Samuel, S. D., & Apata, O. M. (2019). Perception of Farming Households towards Agricultural Information Dissemination by Mass Media Channels in Southwest Nigeria. Available at SSRN 3773070. DOI: http://dx.doi.org/10.2139/ssrn.3773070

12. Gupta, D.K. (2005). Modern encyclopedia of media and mass communication. Rajat Publications, New Delhi, India.

13. Richard, D. (1999). Training community anirnators as a participator Communication for development practitioners, Communication. One approach for sustainable Development.

14. Apata, O. M. (2010). Farmers' use of newspapers as channels of agricultural information in Ekiti State, Nigeria. *Journal of Environmental Issues and Agriculture in Developing Countries*, 2(2), 1-9.

15. Toluwase, S. O. W., & Apata, O. M. (2017). Use of ICTs as a Source of Information for Improving Agricultural Productivity in South-West, Nigeria. *International Journal of Agricultural Economics*, 2(3), 50-54.

16. Mansell, R. and Wehn, U, (1998). Knowledge Societies. Information technology for development*,* Oxford: Oxford University Press.

17. Folayan, O, Ifeoluwa, M. and Joshua, A. (2016). Socio – Economic Characteristics and Access of Rural Farmers to Information and Communication Technologies among Ifedore Local Government Area of Ondo State, Nigeria. *International Journal of Information Technology and Business Management,* 54(1), 1-15.

18. Adejo, L.O. (2015). Effect of inquiry method on academic performance of chemistry students in senior secondary schools in Kaduna State. Unpublished Master Degree Thesis, ABU, Zaria.

19. Chapman, R., Blench, R., Kranjac-Berisavljevic, G., & Zakariah, A. B. T. (2003). Rural radio in agricultural extension: the example of vernacular radio programmes on soil and water conservation in N. Ghana. AgREN Network Paper, 127(2).

20. Syiem, R., & Raj, S. (2015). Access and usage of ICTs for agriculture and rural development by the tribal farmers in Meghalaya state of North-East India. *Agrarinformatika/ Journal of Agricultural Informatics*, 6(3), 24-41.

21. Munyua, H. (2000). Information and Communication Technologies for rural development and food security: Lessons from field experiences in developing countries. Sustainable Development Department (SD), FAO of the United Nations.

22. Haruna, A. and Baba, D. (21017). An appraisal of famers internet use for sourcing agricultural information in North–Western Nigeria. SHS Web of Conference, 33. DOI: http://dx.doi.org/10.1051/shsconf2017330005

23. Mtega, W. P. & Msungu, A. C. (2013). Using information and communication technologies for enhancing the accessibility of agricultural information for improved agricultural production in Tanzania. *The Electronic Journal of Information Systems in Developing Countries*, 56(1), 1-14.

24. Kerr, C., Pettit, B., Roland, K., Steffens, C., Tunning, M., & Whitsett, A. (2007). Communications channels in the Sahel using Mauritania, Mali, Niger, and Chad as a case study. Strategic Command Offutt Afb Ne.

25. Agwu, A. E., Uche-Mba, U. C., & Akinnagbe, O. M. (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. *Journal of Agricultural Extension*, 12(1).

26. Gelb, E., Maru, A., Brodgen, J., Dodsworth, E., Samii, R., & Pesce, V. (2009). Adoption of ICT Enabled Information Systems for Agricultural Development and Rural Viability. Pre-Conference workshop summary, August 2008. In Global Forum on Agricultural Research (GFAR). Tokyo, Japan.

27. Shankaraiah, N., & Swamy, B. N. (2012). Mobile communication as a viable tool for Agriculture and Rural Development. Proceedings of M4D 2012 28-29 February 2012 New Delhi, India, 28(29), 134.

28. Ishwar, S, Peeyush, S, Salin K., and John, K. (2018). Assessing farmers' access to ICT and non-ICT sources for agricultural development in Semi-Arid Region in India. *Journal of Agricultural Informatics,* 9(2), 22-39.

29. Ortmann, G.F. (2000). Use of Information Technology in South African Agriculture. *Agrekon,* 39(1), 26-35.

30. Aduwa-Ogiegbaen, S.E, and Iyamu, E.O. (2005). Using Information and Communication Technology in Secondary Schools in Nigeria: Problems and Prospects. *Educational Technology & Society*, 8(1), 104-112.