Proceedings of the Annual Conference of the Agricultural Extension Society of Nigeria
Number: Thirty-First Annual Conference
Theme: Strengthening the Agricultural Extension Innovation Systems for Greater Development Impacts
Date: 12th to 15th April 2026
Venue: Michael Okpara University of Agriculture, Umudike, Abia State, Nigeria
ISSN: 1595 – 1421.
Website: https://info@ajol.org,
Email: agricultural.extension.nigeria@gmail.com; editorinchief@aesonnigeria.org

Effect of Digital Extension Services on Cassava Farmers' Education in Abia State, Nigeria

https://dx.doi.org/10.4314/jae.v31i1.34S

Igwe, Clara Onyinye[1*], Adolphus, Gold[2] and Atasie, Chikerenma Mary[3]

[1,3] Michael Okpara University of Agriculture, Umudike, Abia State, Nigeria,[2] Rivers State University PortHarcourt:
*Correspondence and presenting author: igwecok@gmail.com, +2348063480927; [2]gold.adolphus1@ust.edu.ng, +2348036746675; [3]atasiechikerenma@gmail.com, +2347066094683

Abstract

The study assessed the effects of digital extension services on cassava farmers' education in Abia State, Nigeria. A multistage sampling procedure was employed in selecting the 100 cassava farmers for the study. Data for this study were analyzed using percentage and simple regression analysis. Result showed that 20% of the cassava farmers indicated that information on identification of pest and disease outbreak were available, management and control of cassava disease (73%), improved cassava variety (81%) and online sales and promotion (50%). The result showed a grand mean of ($\bar{x}$= 2.95) indicating access to digital extension services. The regression result showed that coefficient of formal education was highly significant at 1% level and was positively related to access to extension digital services. In conclusion, cassava farmers had access to digital extension services and this translated to impacting very positively on the farmer's education, yield, income and household welfare. The study recommended that cost of data subscription should be subsidized by government to enable farmers' access and use digital tools for educational purposes.

Key words: Digital communication tools, extension services, farmers' education.

Introduction

Extension is a non-formal educational process directed towards the farming population to help them solve their problems, increase the efficiency of the family farm, increase production and general increase the standard of living of the farm family (Federal Ministry of Agriculture and Food Security (FMAFS), 2023). Basically, agricultural extension works with people, not for them, it is accountable to its clients, works with different target groups, cooperates with other rural development organizations and brings forth effective, efficient and equitable services delivery to farmers (Aker & Ghosh, 2021).

In recent years, extension service delivery has witnessed a significant transformation due to the integration of digital technologies into traditional practices. The emergence and widespread adoption of digital technologies have reshaped the landscape of agriculture extension services, fostering increased efficiency, accessibility, and sustainability(Mukund, et al., 2021). Digital change is a foundational change since it influences how individuals, things, and associations coordinate their exercises (Klerkx and Rose, 2020). Dissemination of information, building capacity of farmers through the use of a variety of communication methods and helping farmers make informed decisions are the major roles of agricultural extension. Many farmers have vast amounts of agricultural knowledge that has been transmitted throughout generations, yet, the existence of new agricultural technologies and changes in farm conditions ranging from soil degradation, to market conditions, require ongoing learning and experimentation to optimize productivity. Agriculture at its core has not changed much for the last 100 years; crops still require fertilizer, good and improved seeds, sunshine and water to grow (Mukund et al, 2021).

Digital extension services refer to the use of Information and Communication Technologies (ICTs) to disseminate agricultural knowledge and practices to farmers (Adegbite, et al., 2020). These services include SMS-based advisories, mobile applications, interactive voice response (IVR) systems, and social media platforms such as WhatsApp and Facebook. Studies have shown that these tools provide farmers with timely access to weather forecasts, pest control measures, and market prices (Aker and Ghosh, 2021). Digital agricultural extension services means providing services at the right time and facilitating adoption of new agronomic practices, resulting in yield improvements and higher incomes for farming households (FMARD, 2023). Digitalized extension service is a scalable, cost-effective solution that allows farmers access to actionable knowledge (Kurdyś-Kujawska et al*,* 2021). It helps to reach large number of farmers and other key actors in the value chain in different locations with the same extension messaging including data needs, advisory information, input availability, weather prediction, soil fertility (FMAFS, 2023).

Even when there is an in-person extension, conventionally in extension services interactive platforms are significant addition to improve the system. When conventional in-person communication networks are impossible in an emergency setting, investing in digital tools to provide farmers with information, market connections, gathering real-time information on the challenges on ground and adapting these tools to tackle new challenges becomes an urgent priorities (Olagunju et al*.,* 2021). Digitalization of agricultural extension is now helping millions of farmers around the world gain access to the best agricultural knowledge and advice they need.

Agricultural extension education have been offered since colonial times to help deliver essential knowledge, including agricultural technology to farmers and rural dwellers in

both developed and developing countries (Danso-Abbeam, Ehiakpor, and Aidoo 2018). Farmers education will lead farmers to technical innovations, shifting towards high-return crops, scale economies, better market access condition, removing of less productive labor from farming and livestock production (Grote et al, 2021). Considering the opportunities made available to farmers when educated, it is important to ascertain digital extension services on framers education in Abia State, Nigeria. The broad objective of the study is to ascertain digital extension services on cassava farmers' education in Abia State, Nigeria. Specifically, the study; describe the socioeconomic characteristics of cassava farmers in the study area; identify the digital extension services available to cassava farmers; determine their level of access to these digital extension services; and identify the challenges faced by cassava farmers in getting education using digital extension services.

Hypothesis of the study

Ho1: The level of cassava farmers` formal education has no effect on their access to digital extension services.

Methodology

The study was conducted in Abia State, Nigeria. Abia state has a land mass of 700 square km with 17 local government areas. The state lies between longitudes 7^0 23` and $8^0$ 02` East of Greenwich Meridian and latitudes 5^0 49 and 6^0 12` North of the Equator. Abia consist of three agricultural zones, namely; Aba, Umuahia and Ohafia. These zones favour the production of roots and tuber crops. The population of Abia State is 2,833,999 comprising 1,434,193 males and 1,399,806 females. This population consists of people in all occupations with about 65 percent of them engaging in agriculture (NPC, 2008).

A multistage random sampling procedure was employed in selecting the sample for the study. The sampling frame from where the sample was drawn was obtained from the community list of farmers across the zones in Abia State.

The first stage involved a random selection of four blocks in Abia State. The second stage involved the selection of five circles from the selected blocks. In the third stage, five (5) farmers were randomly sampled from each community making a total of 100 cassava farmers from the state. Therefore, the sample size for the study was be one hundred (100) cassava farmers.

Data for this study were analyzed using percentages, means and simple regression analysis.

The simple linear regression model is expressed as follows;

$Y = f(X)$

The model is expressed explicitly as;

$Y = \beta_0 + \beta_1 X_1 + e_i$

Where;

Y = define the predictable part of any Y score for fixed values of X.

X = defines the predicted part of any Y score.

β_0 and β_1 can be thought of as values that maximize the explanatory power or predictive accuracy of X in relation to Y.

Therefore, the linear regression model used to estimate the effect of digital extension services on cassava farmers education in Abia State, Nigeria is expressed as:

$Y = b_0 + b_1 X_1 + e_i$

Where;

Y = Access to digital extension services (mean score)

X = Cassava farmers education (years)

b_0 = regression constant

b_1 = slope of the regression that the extent by which the dependent variable (Y) is predicted by the independent variable (X).

e_i = error term

Results and Discussion

Digital Extension Services Available to the Cassava Farmers

Result on digital services available to the cassava farmers showed that 20% of the cassava farmers said that information on identification of pest and disease outbreak were available, management and control of cassava disease (73%), improved cassava variety (81%), market information (15%) and online sales and promotion (50%). These were the digital extension services available to farmers in the study area. The implication of this study is that, given the rising call for digital extension services, which is geared towards boosting agricultural production while reducing drudgery, cassava farmers are embracing digital extension services to enhance their education and have access to information that are of numerious benefit. According to Oyakhilonen et al, (2020), one of the ways to bring about improvement in cassava production is the provision of right information to farmers through appropriate channels that are available and accessible to them.

Table 1: Digital extension services

Digital extension services	Percentage
Identification of pest and diseases outbreak	20.0
Management and control of cassava diseases	73.0
Improved variety of cassava	81.0
Market information	15.0
Online sales and promotion	50.0

Source: ***Field survey, 2025***

Access to Digital Extension Services by the Cassava Farmers

Result on level of access to digital extension services by cassava farmers is presented on Table 9. The result showed that the farmers have access to information on identification of pest and diseases outbreak (x̄=2.44), access to information on management and control of cassava diseases (x̄=2.51), access to information on improved variety of cassava (x̄=3.14), access to information on market (x̄=3.22), and access to information on online sales and promotion (x̄=3.45). Access to digital extension service have the potential to positively affect sustainable development since it can act as a tool to decrease information gaps. It can also empower farmers by reaching out to those geographically or socially isolated from information. The high trend of the use of Whatapp indicate that farmers may enhance learning and share information with extension agents or fellow farmers and this communication within close circle will give them sense of security in terms of farmers knowledge exchange and access to required information (Khan et al., 2020).

Table 9: Access to digital extension services

s/n	**Digital extension services**	**Mean**
	Identification of pest and diseases outbreak	2.44
	Management and control of cassava diseases	2.51
	Improved variety of cassava	3.14
	Market information	3.22
	Online sales and promotion	3.45
	Grand mean	2.95

Source: ***Field survey, 2025***

Challenges Faced by Cassava Farmers in Getting Education Using Digital Services

From the result, the following challenges were faced by cassava farmers in getting education using extension digital services; Poor network ($\bar{x}$=3.29), poor electricity supply ($\bar{x}$=3.40), poor knowledge of use of digital tools ($\bar{x}$=3.37), high cost of data ($\bar{x}$=2.93), high cost of mobile phone and computer ($\bar{x}$=2.73) and lack of training on the use of digital services ($\bar{x}$=3.47). Khan, et al*.,* (2020) opined that high cost high cost of gadgets, lack of skills and poor knowledge to the use of digital tools are the major barriers to the use of internet based communication tools. Furthermore, poor quality tools, erratic electricity, poor connectivity and high data consumption tariffs were some of the problems faced with the use of digital tools to access digital extension services.

Table 2: Distribution of farmers according to the challenges they faced in getting education using digital services

Challenges	Mean
Poor network	3.29
Poor electricity supply	3.40
Poor knowledge of the use of digital tools	3.37
High cost of data	2.93
High cost of mobile phone and computer	2.73
Lack of training on the use of digital services	3.47
Lack of farmers willingness to use digital tools	2.40
Grand mean	3.1

Source: ***Field survey, 2025***

Effect of Digital Extension Services on Cassava Farmers Level of Formal Education

Table 3 shows an R^2 of 0.744 implying that about 74.4% of the variations in the dependent variables were explained by the explanatory variable expressed in the model. The F-statistics (285.367***) was significant at 1% level of significance which implies that the predictor variables influenced access to digital services of cassava farmers in the study area. The coefficient of formal education was highly significant to access to extension digital services and was positively related. This implies that the higher the educational level of the farmers, the higher their access to extension digital services. This implies that education increases the level of access and use of digital services by the farmers. It is clear that using digital services by the extension personnel and farmers can enhance the different practices of social work, such as the delivery of services, education, and research, when used thoughtfully and effectively (Ajaegbu et al*.,* 2019).

Table 3: simple regression estimate on the effect of digital extension services on cassava farmers' level of formal education

Variables	Std. Error	Beta	t-ratio
Constant		9.501	-13.171*
Formal education	.516	.863	16.893*
F-stat			285.367**
R2			.744
R-adjusted			.742

Source: ***Field survey, 2025***

Conclusion and Recommendation

The cassava farmers had access to digital extension services and this translated to impacting very positively on the farmers education, yield, income and household welfare. There is still room or potentials for more access of farmers to digital extension services which would go further to better their household welfare. Since access to digital extension services had a positive and significant relationship with personal characteristic like educational level of the farmers in the study area. Based on the major findings of the study, the following recommendations were made;

- **i.** Government and telecommunication companies should invest in improving coverage and electricity supply in rural areas to enhance the use of digital communication tools for digital extension service delivery.
- **ii.** Agricultural extension agents should provide capacity programmes for cassava farmers on the possible ways to get education using digital tools.
- iii. Government and telecommunication companies should come up with policy that will reduce the tariff of data so that it can be affordable easily to all.

References

Adegbite, D. A., Olorunsomo, S. O., & Kehinde, A. D. (2020). The role of digital extension in improving farmers' knowledge in Nigeria. *African Journal of Agricultural Extension*, 14(2), 78-92.

Aker, J. C., & Ghosh, I. (2021). The promise (and pitfalls) of ICT for agriculture. Annual Review of Resource Economics, 13, 425-450.

Federal ministry of Agriculture and food security and United states Agencies for international development (2023). Principles and Practices in Agricultural Extension and Advisory Services. A harmonized extension manual for extension practitioners. Federal Department of Agricultural Extension, FMARD, Abuja

Grote, U., Fasse, A., Nguyen, T. T., & Erenstein, O. (2021). Food security and the dynamics of wheat and maize value chains in Africa and Asia. *Frontiers in Sustainable Food Systems*, *4*, 1-17.

Khan, N., Siddiqui, N. B., Khan, N., Ahmad, Z., Ismail, S., Javed, H. H., Ali, S., Kazim, R., Azam, T., & Kasi, A. K. (2020). Mass Media Role in Agricultural and Rural Development. *International Journal of Advanced Research in Biological Sciences, 7*(4), 199-209.

Klerkx L, Rose D, (2020). Dealing with the game-changing technologies of Agriculture 4.0: Howdowe manage diversity and responsibility in food system transition pathways? *Global FoodSecurity.*2020; 24: 100347

Kurdyś-Kujawska, A., Strzelecka, A., & Zawadzka, D. (2021). The Impact of Crop Diversification on the Economic Efficiency of Small Farms in Poland. *Agriculture,* 11(3), 1-21.

Mukund P., Suhas P.W and Anantha K.H (2021). Digital Technologies for Agricultural Extension international Crops Research Institute for the semi-arid (ICRISAT), Pantacheru, India

Olagunju, O., Adetarami, O., Koledoye G.F., Olumoyegun, A.T and Nabara, I.S (2021). Digitalization of Agricultural Extension System for Effective Management of Emergency in Nigeria. *Journal of Agricultural Extension*. Vol. 25(4).

Olanrewaju, O.O, Akintude, IO, Popoola, M, A & Omotosho, J. A. (2023). Effectiveness of Digital Communication Tools in improving poultry farming practices in Southeast Nigeria. Journal of Agriculture and Rural development, 22(4), 212-225