USE OF DIGITAL EXTENSION TOOLS FOR AGRICULTURAL INFORMATION MANAGEMENT AMONG CASSAVA VALUE CHAIN ACTORS IN IBADAN METROPOLIS, OYO STATE, NIGERIA

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[1]Olushola Fadairo, [2]Adenike Durojaiye, [3]Racheal Adegbayi
[1]Directorate of Entrepreneurship, Innovation and Sustainability Emmanuel Alayande University of Education, Oyo, Nigeria; [2]Department of Agricultural Science Education, Emmanuel Alayande University of Education, Oyo, Nigeria; [3]Department of Agricultural Extension Forestry Research Institute, Nigeria
e-mail: fadairoos@eauedoyo.edu.ng; dairom2@gmail.com

ABSTRACT

Poor coverage of farmers by extension services and other limitations necessitates the need to adapt the agricultural process to new opportunities, one of which is digital extension. This is moreso important for cassava value chain actors given the recognition of the crop for food security in Nigeria and its widespread promotion by several local and regional development interventions. Therefore, the use of digital extension tools for agricultural information management among cassava value chain actors in the Ibadan metropolis was investigated. Multi-stage sampling procedure was used to select 195 cassava value chain actors comprising extension workers, farmers, processors, and marketers. Data were collected using a structured questionnaire on their enterprise characteristics, awareness, access, and use of digital extension tools for agricultural information management. Data were analysed using frequency distribution, percentages, mean, and ANOVA at $\alpha_{0.05}$. Respondents were mostly male (51.6%) and had 7.3±5.2 years of experience in the cassava value chain. Awareness and access levels to digital communication tools were high among the cassava value chain actors while the extent of use of the tools was still low. Agricultural extension workers were the highest user ($\bar{x}$=26.4) while the processors were least users ($\bar{x}$=15.0) of the digital extension tools. Awareness and use of digital tools for extension information management is still below average among the cassava value chain actors. More emphasis is required to be put on innovative digital information management systems in the traditional extension approach to promote its wider use.

Keywords: Digital extension, Information management, Cassava value chain, Innovative agriculture.

INTRODUCTION

Cassava is a major staple food and is widely grown across Nigeria owing to its wide adaptability, economic importance and acceptance. Oyo State in the South-west Nigeria is a major producer of cassava. In Nigeria, Cassava is increasingly becoming a raw material for food, feed and industrial applications. Nigeria is the largest producer of cassava, and 12th largest for maize in the world, amounting to annual production of about 60 million MT. Nevertheless, the nation is still known for producing below its capacity with a national average of 9 t/ha (FAOSTAT, 2018). Worse still, use of available improved technologies and innovations to address low cassava productivity in

most cases, have been limited by ineffective information transfer among the actors in the value chain (Atser et al, 2024).

In Nigeria, agricultural extension services play critical roles in disseminating information on improved farm technologies to farmers. Unfortunately, the performance of these service providers has been largely disappointing in the recent past due to numerous intractable challenges which bothers on their effectiveness, efficiency and reach (Atser et al, 2024). These challenges include the significant financing shortfall for agricultural extension services, the low farmer-extension workers ratio, the aging of the extension agents and the dearth of new employees. Davis et al (2019) put the total workforce of public extension agents at roughly 7,000 and the ratio of extension agents to farmers at between 1:5,000 and 1:10,000. Additionally, 60% of extension agents were documented to be above the age of 40. Against this background, some authors have argued in support of digitalization of extension services as a powerful tool to reach most smallholder farmers (Adesope, 2021). This study was thus conducted to assess the existing digital extension landscape and use among the cassava value chain actors in Ibadan Metropolis, Oyo State, Nigeria, and the extension workers providing services to them.

METHODOLOGY

The study was carried out in Ibadan metropolis which is the capital of Oyo State, located in the southwestern Nigeria. The city has 11 Local Government Areas (LGAs) and covering an area of 129.65km2 has the largest human population in the state and is also renowned for largest land size in Nigeria. A multi-stage sampling procedure was used to select cassava farmers (44), processors (12), marketers (28) [who were registered with their commodity association] and agricultural extension workers (11) from three LGAs (Akinyele, Ido and Lagelu) in the study area. Data were collected using a structured questionnaire on respondents' enterprise characteristics, awareness, access, and use of digital extension tools for agricultural information management. Awareness was measures as yes and no; access was measured as always, sometimes and never; use was measured as frequently, occasionally, just a trial and never. Scores were allotted to the options following the Likert-type scale procedure. Data were analysed using descriptive statistics and ANOVA at $\alpha_{0.05.}$

RESULTS AND DISCUSSION

Table 1 shows that 51.6% of the respondents were male indicating almost a parity level of male and female involvement in the cassava value chain sub-sector in the study area. The respondents were mostly educated at Diploma/Certificate level (57.9%), aged 39.4±8.1 years, had 7.3±5.2 years of experience in the cassava value chain sub-sector and have attended 2.1±2.0 number of trainings on digital agricultural extension. The respondent's fair level of literacy, youthfulness and experience in the value chain presents an obvious advantage for improving the cassava production sub-sector in Nigeria if well harnessed.

Table 1. Respondents' personal characteristics.

Variables	F	%
Sex		
Male	49	51.6
Female	46	48.4
Education		
No education	1	1.1
Diploma/certificate	55	57.9
Bachelor and above	39	41.1
Years of experience	Mean/SD = 7.3±5.2	
Numbers of trainings attended	Mean/SD = 2.1±2.0	
Age in years	Mean/SD = 39.4±8.1	

Table 2 shows that virtual classroom (70.5%) and animated video clips (70.5%) enjoyed the most popularity of all the digital tools among the value chain actors. This was followed by mobile applications (66.3%) and skits (65.3%). Respondents (99.9%) were mostly unaware of mobile phones. Video conferencing and IITA news App as forms of digital extension tools. In similar vein, skits and virtual classroom ($\bar{x}$=1.12) were mostly accessible to the respondents among the digital extension tools while Mobile phone, video conferencing were least accessible ($\bar{x}$=1.1). This trend was also observed for use of the digital extension tools as virtual classroom and animated video clips ($\bar{x}$=2.69) were the mostly used of the tools in cassava value chain information exchange among the respondents. Largely, the distribution suggests a plausible interrelationships among the value chain actors' awareness, access and use of the tools. Literature posits that awareness, and access determines use of technology (Cui et al 2022).

Table 2. Awareness, access and use of digital extension tools among cassava value chain actors.

Digital tools	Awareness (%)	Access index	Use index
Mobile application e.g. e-diary, herbicide calculator	66.3	1.09	2.41
Interactive Voice Response (IVR)	63.2	1.06	2.44
Virtual Classroom e.g. Google meet	70.5	1.12	2.69
Web-based extension platform e.g. Farm Crowdy and Agro Data	57.9	0.90	2.13
Geographical Information System (GIS)	61.1	0.83	1.87
Animated video clips	70.5	1.09	2.69
Satellite system	55.8	0.70	1.66
Drones	55.8	0.63	1.48
Internet of things/Remote sensing	54.7	0.82	1.88
Skit	65.3	1.12	2.08
Mobile phone	1.1	0.10	2.41
Video conferencing	1.1	0.10	2.44
IITA news App	1.1	0.10	2.15

Table 3 shows that while awareness and access levels to digital communication tools were high among 57.9% and 53.7% of the cassava value chain actors, respectively, the extent of use of the tools for innovation dissemination and exchange was still low among most of the actors (51.6%). The low usage despite a high awareness and access are traceable to the problem of underinvestment and poor reach of the potential users by the e-digital extension service providers (Baconguis, 2022). This is addition to the challenge of poor internet connectivity.

Table 3. Categorization of cassava value chain actors based on their levels of awareness, access and use of digital tools.

	Awareness level		**Access level**		**Use extent**	
	F	**%**	**F**	**%**	**F**	**%**
Low	40	42.1	44	46.3	49	51.6
High	55	57.9	51	53.7	46	48.4
	Min=0; Max =12; 6.2±4.1		Min=0; Max=22; 9.4±6.8		Min=10; Max=40; 20.8±8.7	

Table 4 shows a significant difference in the use of digital extension tools among the cassava value chain actors (F=3.598; $p < 0.05$) with agricultural extension workers having the highest level of usage ($\bar{x}$=26.36) while the processors had the least usage level ($\bar{x}$=20.29).

Table 4. Difference in the use of agricultural digital extension tools among the cassava value chain actors.

	Sum of square	**df**	**Mean square**	**F**	**Sig**
Between groups	766.614	3	255.538	3.598	0.017
Within groups	6462.692	91	71.019		
Total	7229.305	94			
Mean Separation of value chain actors					
Processors $\bar{x}$=15.00	Marketers $\bar{x}$=20.29	Farmers $\bar{x}$=21.39	Agricultural extension workers $\bar{x}$=26.36		

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