Digital Technologies and Enhancing Agricultural Production among Farmers in South West Nigeria

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ABSTRACT

The study investigated issues relating to digital technologies and enhancing agricultural production among farmers in South West, Nigeria. Specifically, the study determined the ways digital technologies could enhance agricultural production; challenges militating against utilization of digital technologies in agricultural production; and strategies for enhancing the use of digital technologies in agricultural production. A descriptive survey research design was adopted. The study was carried out in South West, Nigeria. The population for the study consisted of 600 farmers and 120 extension agents. A descriptive survey research design was adopted. Accidental sampling technique was used to sample the respondents. The instrument for data collection was structured questionnaire developed by the researcher. Data collection was carried out by the researcher and three research assistance. Mean, standard deviation and t-test were used to analyze the data collected. The findings revealed 11 ways digital technologies could enhance agricultural production in South West, Nigeria; the finding also identified 12 challenges militating against utilization of digital technologies in agricultural production in South West, Nigeria; furthermore, result found 10 strategies for enhancing the use of digital technologies in agricultural production in South West, Nigeria. Based on the findings, it was concluded that digital technologies are crucial for enhancing agricultural production and farmers need to be equipped with the skills and resources needed to adopt digital technologies in their farm operations. The study recommended that government and private sector should invest in developing digital infrastructure to facilitate access to digital technologies among farmers in Southwest Nigeria; training programmes should be implemented to enhance digital literacy among farmers to enable them to effectively utilize digital tools and technologies.

Keywords: Digital Technologies, Agricultural Production, Farmers, Enhancing, South-West Nigeria,

INTRODUCTION

The agricultural sector in Nigeria, particularly in the South West region, plays a crucial role in the national economy, employing a significant portion of the population and contributing to food security. However, traditional farming practices often limit productivity and efficiency. Recent advancements in digital technologies present opportunities to enhance agricultural production among farmers in this region. Digital tools, including mobile applications, precision agriculture, and blockchain technology, have been recognized for their potential to transform agricultural practices, leading to improved yields, resource management, and market access to farmers all over the world and including in the South West region of Nigeria (Adebayo et al., 2021). The South West region of Nigeria is characterized by diverse climatic conditions, which influence agricultural productivity. The integration of digital technologies can help tailor farming practices to meet the unique challenges faced by farmers in this area (Eze et al., 2021). For instance, the use of precision agricultural techniques combined with data analytics can lead to optimized resource allocation, thereby minimizing waste and maximizing agricultural production (Ogunbanjo et al., 2021).

Agricultural production entails methods and practices of growing food and managing crops and livestock, and it includes the economic aspect of producing these goods for trade, consumption, and profit Grayson and Lewis (2021). It refers to the process of cultivating soil, growing crops, and raising livestock for food, fiber,

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and other products used to sustain and enhance human life (Smith, 2021). Agricultural production is a systematic approach to utilizing land, labor, capital, and management skills to produce food and raw materials that meet human needs (Jones & Patel, 2022). According to Harasym (2019), sustainable agricultural production involves utilizing environmentally-friendly practices that promote long-term ecological balance while meeting the needs of consumers. Agricultural production involves both the production of crops and livestock as well as processing crops and livestock products for man's benefits. Enhancing agricultural production is paramount for improving food security in Nigeria. Agricultural production can be divided into two broad categories, namely: crop production and livestock production. In crop production, the operations needed can be categorized into: pre-planting operation, planting operation, post-planting operations and post-harvest operations (Grayson & Lewis, 2021). While in livestock, operations required may include housing, feeding, health management, breeding, processing, marketing among others. All these operations can be enhanced through the use of digital technologies.

Digital technologies refer to tools, systems, and practices that utilize digital technology and data to enable communication, collaboration, and information sharing (Oyediran & Tijani, 2021). Digital technologies refer to electronic tools, systems, devices, and resources that generate, store, or process data (Dyer et al 2021). They encompass a wide range of technologies, from simple digital devices to complex computing systems. Digital technologies according to Ayo & Adewumi, 2019) include a wide range of electronic devices, software applications, and online platforms that enable the processing and sharing of information in digital form. It encompasses the use of digital devices, and applications to transform traditional practices and processes in various sectors into modern ways (Igwe & Aguegboh, 2020).

Digital technologies in agricultural production refers to the use of electronic devices, software, and networks to optimize farming practices, increase efficiency, and improve crop yield (Ghazi et al., 2021). This includes tools such as drones, sensors, and smart farming applications that collect and analyze data to inform decision-making processes. According to Li et al. (2019), digital technologies in agricultural production encompass the application of artificial intelligence (AI), machine learning, and data analytics to optimize decision-making processes and improve crop and livestock management practices.

Some examples of digital technologies that can be utilized in agriculture include drones, precision agriculture, big data analytics, artificial intelligence (AI), blockchain technology, mobile applications, robotics and automation, climate-smart agriculture technologies among others (Anderson & Gaston, 2021). These technologies can significantly reduce labour costs and improve efficiency. The integration of digital technologies in agriculture as buttressed by Oluwasemilore and Oluwasola (2021) facilitate information dissemination, empowering farmers with timely data on weather conditions, pest management, and market prices. Furthermore, mobile apps have been developed to connect farmers to agronomists and experts, fostering knowledge exchange and improving farming techniques (Ihenacho et al., 2021). In a study on the impact of mobile technology in agriculture, Afolabi and Osei (2024) found that farmers utilizing these technological tools reported increased yields and satisfaction with their farming practices, illustrating the effectiveness of digital solutions in enhancing agricultural production.

In spite of the numerous benefits of digital technologies in agricultural production, there are many challenges militating against the utilization of digital technologies by farmers to enhance agricultural production. Smith (2021) stated that majority of the farmers in Nigeria including those in South West often lack the required digital literacy and technical skills to effectively use digital technologies. Another challenge is high cost of technology. Johnson and Williams (2022) noted that the initial investment required for digital tools and technologies such as sensors, drones, and software subscriptions can be prohibitive for small-scale farmers. Also, Taylor and West (2022) noted that the effectiveness of digital agricultural technologies relies heavily on sufficient internet and mobile connectivity, which may be lacking in rural regions.

However, despite the challenges, digital technologies remain vast potential for enhancing agricultural production in the South West region and Nigeria at large. The nation continues to face significant challenges in agricultural production and food security. The South West region, with its fertile soil and favorable climate, has immense potential for agricultural growth, but farmers in the region face numerous challenges, including limited access to information, inadequate financial services, poor market linkages, climate change, low

agricultural productivity among others (Ogunniyi et al., 2022). The low agricultural production in the region could be as a current of the current practice among farmers in the region. Most farmers in the South West region of Nigeria rely heavily on traditional farming systems which have impacted negatively on their farm output. This situation calls for targeted interventions that address the barriers to digital technology adoption and embrace comprehensive approaches to enhance the effective utilization of digital technologies by farmers in the region (Adeoti et al., 2021). Hence, this study aimed at investigating digital technologies and enhancing agricultural production among farmers in South West, Nigeria.

Purpose of the Study

The general purpose of this study was to investigate digital technologies and enhancing agricultural production among farmers in South West Nigeria. Specifically, the study determined:

1. ways digital technologies could enhance agricultural production in South West, Nigeria;
2. challenges militating against utilization of digital technologies in agricultural production, Nigeria;
3. strategies for enhancing the use of digital technologies in agricultural production.

Research Questions

The following research questions guided the study.

1. What are ways digital technologies could enhance agricultural production in South West, Nigeria?
2. What are the challenges militating against utilization of digital technologies in agricultural production?
3. What are the strategies for enhancing the use of digital technologies in agricultural production?

Research Hypotheses

The following research null hypotheses were formulated and tested at 0.05 level of significance:

1. There is no significance difference in the mean responses of farmers and extension agents on the ways digital technologies could enhance agricultural production in South West, Nigeria.
2. There is no significance difference in the mean responses of farmers and extension agents on the challenges militating against utilization of digital technologies in agricultural production.
3. There is no significance difference in the mean responses of farmers and extension agents on the strategies for enhancing the use of digital technologies in agricultural production in South West, Nigeria.

RESEARCH METHODOLOGY

This dealt with the procedures followed in carrying out this study.

Design of the Study: The study adopted a descriptive survey research design.

Area of Study: The study was conducted in South West, Nigeria. South West comprised of six states: Ekiti, Lagos, Ogun, Ondo, Osun, and Oyo. The region is well-known for agricultural activities.

Population for Study: The population for the study was 720 which consisted of 600 farmers and 120 extension agents. The population was randomly selected from the six states in South West, Nigeria. That is, 100 farmers and 20 extension agents from each of the state in South West, Nigeria. The selection of 720 populations is due to the fact that there was no statistical record of the total registered farmers in South West region of Nigeria.

Sample for the Study: The entire population of 720 was studied since it was manageable. Accidental sampling technique was used to sample the respondents from the six states in South West, Nigeria.

Instrument for Data Collection: The instrument for data collection was structured questionnaire designed by the researcher. The instrument was structured into four-point response options of Strongly Agree (SA), Agree

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(A), Strongly Disagree (SD) and Disagree (D) with assigned weights of 4, 3, 2, and 1 respectively. The instrument was subjected to face validation by three experts; two extension agents and one professional farmer from South West, Nigeria. Also, the reliability of the instrument was determined using Cronbach Alpha method. 38 copies of the validated instrument were administered to farmers and extension agents in Edo State, Nigeria. The completed instruments were analyzed to determine the reliability of the instruments for the study. The co-efficient yielded 0.81% reliability co-efficient.

Data Collection Methods: The instrument was administered by the researcher and three research assistants. A total of 720 copies of the questionnaires was administered, that is 600 to farmers and 120 to extension agents. At the end, only 650 of the questionnaires (that is 552 from farmers and 98 from extension agents) were retrieved and used for data analysis. This implied that 70 copies were not used.

Data Analysis Techniques: Data collected were analyzed using mean, standard deviation and t-test statistic. Mean was used to answer the research questions, standard deviation was used to determine how close or far the respondents were to the mean, t-test was used to test the null hypotheses at 0.05 level significance. The cut-off point of 2.50 was used for decision-making for the mean. Any item with a mean rating of 2.50 and above was accepted while any item less than 2.50 was rejected. Similarly, the decision rule for the hypotheses is that any null hypothesis whose t-value is less than 0.05 level of significance was rejected and regarded as significant, whereas any null hypothesis whose t-value is equal to or greater than 0.05 level of significance was upheld and regarded as not significant. All the data analyses were carried out with the help of statistical package for Social Sciences (SPSS) 25 version.

RESULTS

Table 1: Mean rating, standard deviation and t-test analysis of the responses of farmers and extension agents on ways digital technologies could enhance agricultural production in South West, Nigeria

S/N	Ways digital technologies could enhance agricultural production are:	$\bar{X}_1$	SD_1	$\bar{X}_2$	SD_2	$\bar{X}_g$	t	Rmks	
1	Utilizing apps for farmers to access market prices, weather forecasts, and agronomic advice	3.41	0.70	3.49	1.00	3.45	0.08	A	NS
2	Enhancing supply chain transparency and traceability through blockchain technology	3.23	0.74	3.23	0.85	3.23	0.09	A	NS
3	The use of drone technology for crop surveillance, and identifying pest infestations	3.29	0.78	3.23	0.86	3.26	0.06	A	NS
4	Using satellite imagery to monitor soil moisture and nutrient levels for improved crop yield	3.16	0.80	3.20	0.79	3.18	0.11	A	NS
5	Utilizing online market tools to connect farmers with consumers and reduce middlemen	3.14	0.87	3.12	0.86	3.13	0.80	A	NS
6	Use of digital software to track farm finances	3.11	0.82	3.11	0.83	3.11	0.09	A	NS
7	Utilization of mobile extension services provide remote advisory services to farmers in rural areas	3.33	0.85	3.21	0.86	3.27	0.17	A	NS
8	Leveraging on AI and machine learning to predict pest outbreaks and suggest interventions	3.28	0.83	3.10	0.79	3.18	0.07	A	NS
9	Offering virtual training programmes for farmers on best practices in agriculture	3.16	0.86	3.10	0.78	3.13	0.08	A	NS
10	Utilizing digital soil mapping technologies to analyze soil health for better crop yield	3.12	0.81	3.10	0.88	3.11	0.11	A	NS
11	Creating online communities for farmers to share knowledge, resource, and experiences	3.30	0.85	3.30	0.86	3.30	0.15	A	NS
	Overall	**3.19**	**0.80**	**3.21**	**0.86**	**3.20**	**0.10**	**A**	**NS**

N1 = Number of Farmers = 552; N2 = Number of Extension agents = 98; $\bar{X}_1$ = Mean score of Farmers; SD_1; = Standard deviation of Farmers; $\bar{X}_2$ = Mean of score of Extension agents; SD_2 = Standard of deviation of Extension agents; $\bar{X}_g$ = Grand mean.; Df = Degree of freedom = 648; t = t-test results; Rmks = Remarks (A = Agreed; NS = Non-Significant).

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The data presented in Table 1 revealed that all the twelve (12) items had means ($\bar{X}$) above 2.50 cut of point; farmers obtained grand mean of $\bar{X}_1$ =3.19; extension agents obtained grand mean of $\bar{X}_2$ =3.29 and overall mean of $\bar{X}_g$ =3.20, which indicated that the respondents agreed that all the 12 items are the ways digital technologies could enhance agricultural production in South West, Nigeria. Also, Table 1 further showed that the standard deviation ranges from 0.70 to 1.00; with overall standard deviation of 0.86; indicating that the respondents were not far from the mean. In addition, the t-test analysis revealed that p-value is 0.10 and is greater than 0.05 (P > 0.05). This revealed that there was no significant difference in the mean ratings of farmers and extension agents on the ways digital technologies could enhance agricultural production. Hence, the null hypothesis was upheld.

Table 2: Mean rating, standard deviation and t-test analysis of the responses of farmers and extension agents on the challenges militating against utilization of digital technologies in agricultural production in South West, Nigeria

S/N	Challenges against utilization of digital technologies (DT)in agric. production are:	$\bar{X}_1$	SD_1	$\bar{X}_2$	SD_2	$\bar{X}_g$	t	Rmks	
1	Inadequate and unreliable internet access in rural farming communities	3.30	0.61	3.34	0.65	3.32	0.06	A	NS
2	Farmers may not have the necessary skills and knowledge to use digital tools effectively	3.50	0.62	3.60	0.60	3.55	0.11	A	NS
3	The initial investment in digital tools may be financially prohibitive for smallholder farmers	3.66	0.64	3.64	0.64	3.65	0.08	A	NS
4	Traditional practices and skepticism towards new technologies can hinder farmers adoption of DT	3.02	0.88	2.98	0.87	3.00	0.06	A	NS
5	Poor power supply can impede the functioning of digital technologies	3.43	0.77	3.41	0.78	3.42	0.18	A	NS
6	Unpredictable weather patterns make digital forecasting tools less reliable	3.10	0.72	3.14	0.72	3.12	0.09	A	NS
7	Many DTs are designed in languages that farmers may not understand, creating a barrier	3.20	0.88	3.10	0.89	3.15	0.17	A	NS
8	Farmers may not be aware of the benefits of DTs or may not know how to use them.	3.10	0.70	3.00	0.73	3.05	0.06	A	NS
9	Farmers may be hesitant to adopt DTs due to concerns about data security, privacy, reliability	2.80	0.51	2.82	0.70	2.81	0.08	A	NS
10	Farmers may be vulnerable to cybersecurity risks, such as hacking or data breaches	3.55	0.56	3.45	0.56	3.50	0.12	A	NS
11	Lack of government support or policies can hinder the adoption of digital technologies in agriculture.	3.20	0.80	3.24	0.80	3.22	0.22	A	NS
12	Cultural attitudes towards digital technologies can influence adoption rates among farmers	3.01	0.89	3.05	0.95	3.03	0.08	A	NS
	Overall	**3.28**	**0.77**	**3.20**	**0.75**	**3.24**	**0.11**	**A**	**NS**

N1 = Number of Farmers = 552; N2 = Number of Extension agents = 98; $\bar{X}_1$ = Mean score of Farmers; SD_1; = Standard deviation of Farmers; $\bar{X}_2$ = Mean of score of Extension agents; SD_2 = Standard of deviation of Extension agents; $\bar{X}_g$ = Grand mean.; Df = Degree of freedom = 648; t = t-test results; Rmks = Remarks (A = Agreed; NS = Non-Significant).

Table 2 showed that the twelve (12) items had means ($\bar{X}$) that ranged from 2.81 to 3.65 which is above the cut of point of 2.50; with farmers obtaining a grand mean of $\bar{X}_1$ =3.28; extension agents grand mean of $\bar{X}_2$ =3.30 and overall mean of $\bar{X}_g$ =3.24. This indicated that the respondents agreed that all the items are the challenges militating against utilization of digital technologies in agricultural production in South West, Nigeria. Table 2 also indicated that the overall standard deviation for farmers is 0.77 while extension agents obtained standard deviation of 0.75, this implied that the respondents were not far from the mean and from one another in their responses. Furthermore, the t-test result in Table 2 indicated that overall probability value of 0.11(P > 0.05)

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was obtained, showing that there was no significant difference in the mean ratings of farmers and extension agents on the challenges militating against utilization of digital technologies in agricultural production in South West, Nigeria. Therefore, the null hypothesis was accepted.

Table 3: Mean rating, standard deviation and t-test analysis of the responses of farmers and extension agents on the strategies for enhancing the use of digital technologies in agricultural production in South West, Nigeria

S/N	*Strategies for enhancing the use of digital technologies (DTs) in agric. production* are:	$\bar{X}_1$	SD_1	$\bar{X}_2$	SD_2	$\bar{X}_g$	t	Rmks	
1	Provide training programme for farmers on digital literacy skills and on how to use DTs effectively	3.60	0.80	3.68	0.81	3.64	0.13	A	NS
2	Invest in infrastructure development, such as internet facilities and electricity to support the use of DTs	3.32	0.68	3.30	0.67	3.31	0.15	A	NS
3	Provide affordable access to digital technologies, such as smartphones, tablets, or laptops, to farmers.	3.00	0.84	3.00	0.88	3.00	0.06	A	NS
4	Establish digital extension services that provide farmers with expert advice, guidance, and support	3.34	0.80	3.30	0.80	3.32	0.05	A	NS
5	Farmers should form a cooperative society to enhance easy access to some digital technologies	2.96	0.52	2.90	0.50	2.93	0.11	A	NS
6	Foster collaborations between farmers, DTs providers, and extension agents	2.87	0.77	2.87	0.72	2.87	0.07	A	NS
7	Promote digital financial services, such as mobile money or digital banking to support farmers' finances	3.10	0.71	3.14	0.77	3.12	0.11	A	NS
8	Provide capacity building programmes for farmers, extension agents to enhance digital agriculture	3.42	0.78	3.60	0.78	3.51	0.07	A	NS
9	Provide accurate weather forecasting services to farmers, enabling them to make informed decisions.	2.70	0.68	2.50	0.66	2.60	0.09	A	NS
10	Establish monitoring and evaluation frameworks to track the impact of DTs on agricultural production	2.79	0.89	2.72	0.90	2.77	0.10	A	NS
	Overall	**3.13**	**0.71**	**3.09**	**0.70**	**3.11**	**0.11**	**A**	**NS**

N1 = Number of Farmers = 552; N2 = Number of Extension agents = 98; $\bar{X}_1$ = Mean score of Farmers; SD_1; = Standard deviation of Farmers; $\bar{X}_2$ = Mean of score of Extension agents; SD_2 = Standard of deviation of Extension agents; $\bar{X}_g$ = Grand mean.; Df = Degree of freedom = 648; t = t-test results; Rmks = Remarks (A = Agreed; NS = Non-Significant).

Table 3 data revealed that the ten (10) items got means ($\bar{X}$) above 2.50 cut of point; farmers had grand mean of $\bar{X}_1$ =3.13; extension agents obtained grand mean of $\bar{X}_2$ =3.09 while the overall mean $\bar{X}_g$ = 3.11, which indicated that the respondents agreed that all the items are the strategies for enhancing the use of digital technologies in agricultural production in South West, Nigeria. Also, Table 3 showed that the standard deviation ranges from 0.50 to 0.90, this implied that the respondents were not far from one another in their responses. The t-test analysis in Table 3 showed that the 10 items had its p-value greater than 0.05 with over-all probability value of 0.11 (P > 0.05). This revealed that there was no significant difference in the mean ratings of farmers and extension agents on the strategies for enhancing the use of digital technologies in agricultural production. Hence, the null hypothesis was accepted.

DISCUSSION OF FINDINGS

The data presented in Table 1 revealed 11 ways digital technologies could enhance agricultural production in South West, Nigeria. These include: utilizing apps for farmers to access market prices, weather forecasts, and agronomic advice; enhancing supply chain transparency and traceability through blockchain technology; using drone technology for crop surveillance, and identifying pest infestations' using satellite imagery to monitor soil moisture and nutrient levels for improved crop yield; utilizing online market tools to connect farmers with consumers and reduce middlemen; use of digital software to track farm finances; utilizing mobile extension

services to provide remote advisory services to farmers in rural areas among others. The supporting hypothesis indicated that there was no significant difference (P > 0.05) in the mean ratings of farmers and extension agents on the ways digital technologies could enhance agricultural production in South West, Nigeria. The finding on the use of drone technology for crop surveillance and identifying pest infestations aligns with Anderson and Gaston (2021) who pointed that drones are equipped with multispectral cameras that can capture detailed images of crops, helping farmers assess plant health, monitor irrigation, and identify weeds or pests. This technology allows for real-time data collection over large areas. Also, the result on leveraging on Artificial Intelligence (AI) and machine learning to predict pest outbreaks and suggest interventions is in support of Kamilaris and Prenafeta-Boldú (2021) who opined that AI algorithms can analyze agricultural data to predict crop yields, detect diseases early, and automate processes like planting and harvesting. In addition, the finding on utilizing apps for farmers to access market prices, weather forecasts, and agronomic advice is in line with Gupta and Rajput (2021) who maintained that mobile apps provide farmers with critical information, such as pest identification, weather updates, and market prices.

The finding in Table 2 identified 12 challenges militating against utilization of digital technologies in agricultural production in South West, Nigeria. The challenges identified are: inadequate and unreliable internet access in rural farming communities; farmers may not have the necessary skills and knowledge to use digital tools effectively; initial investment in digital tools may be financially prohibitive for smallholder farmers; poor power supply can impede the functioning of digital technologies; unpredictable weather patterns make digital forecasting tools less reliable; farmers may not be aware of the benefits of digital technologies among others. Furthermore, the supporting hypothesis revealed that there was no significant difference (P > 0.05) in the mean ratings of farmers and extension agents on the challenges militating against utilization of digital technologies on agricultural production in South West, Nigeria. The finding on lack of necessary skills and knowledge to use digital tools effectively is in support of Smith (2021) who stated that farmers often lack the required technical skills to effectively use digital technologies. According to Izuogu et al. (2023), many farmers in Nigeria including South West region lack the necessary digital skills to effectively utilize digital technologies, hindering their ability to access and benefit from digital agricultural services. Also, the finding on high cost of digital tools support Johnson and Williams (2022) who buttressed that the initial investment required for digital tools and technologies can be prohibitive for small-scale farmers. Costs can include purchasing sensors, drones, and software subscriptions among others. The outcome on cultural attitudes towards digital technologies is in agreement with Peterson and James (2021) who contended that many farmers may be hesitant to adopt new technologies due to traditional practices that have worked well for them over the years.

Table 3 found 10 strategies for enhancing the use of digital technologies in agricultural production in South West, Nigeria. The strategies identified are: provide training programme for farmers on digital literacy skills and on how to use DTs effectively; invest in infrastructure development, such as internet facilities and electricity to support the use of DTs, provide affordable access to digital technologies, such as smartphones, tablets, or laptops, to farmers, establish digital extension services that provide farmers with expert advice, guidance, and support, farmers should form a cooperative society to enhance easy access to some digital technologies, foster collaborations between farmers, DTS providers, and extension agents, among others. In addition, the supporting hypothesis indicated that there was no significant difference (P > 0.05) in the mean ratings of farmers and extension agents on the strategies for enhancing the use of digital technologies in agricultural production in South West, Nigeria. The finding on providing training programme for farmers on digital literacy skills and digital technologies usage is in conformity with Ashoka et al. (2023) who stressed that providing training programme on digital literacy skills and digital technologies usage can improve farmers' skills and technical knowledge, enabling them to effectively utilize digital technologies. The finding on establish digital extension services is in support with Afolabi and Osei (2024) who posited that providing farmers with digital extension services, including mobile apps, SMS, and USSD services, can provide farmers with instant access to agricultural advice, prices, and weather forecasts which will ultimately enhance their agricultural production. In addition, the result on fostering collaborations between farmers, digital technologies providers, and extension agents is in tone with Anderson and Gaston (2021) who noted that fostering partnerships and collaborations between farmers, technology providers, and other stakeholders to promote the adoption of digital technologies is crucial for enhancing the utilization of digital tools and technologies by farmers to improve their agricultural production.

CONCLUSION

The adoption and effective utilization of digital technologies have the potential to transform agricultural production among farmers in Southwest Nigeria. By leveraging digital tools, farmers can improve crop yields, reduce waste, and enhance their livelihoods. However, several challenges, including limited access to digital infrastructure, inadequate digital literacy, and high initial investment costs, hinder the widespread adoption of these technologies. Addressing these challenges is crucial for promoting sustainable agricultural development and ensuring food security in the region. Therefore, the study concluded that digital technologies are crucial for enhancing agricultural production and farmers need to be equipped with the skills and resources to adopt digital technologies in their farm operations.

RECOMMENDATIONS

Based on the findings, the study recommended the following:

1. The government and private sector should invest in developing digital infrastructure, including internet connectivity and mobile networks, to facilitate access to digital technologies among farmers in Southwest Nigeria.
2. Training programmes should be implemented to enhance digital literacy among farmers, enabling them to effectively utilize digital tools and technologies.
3. Extension services should be strengthened to provide farmers with access to technical support, advice, and guidance on the use of digital technologies.

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