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EFFECT OF MOBILE PHONE-BASED AGRICULTURAL INFORMATION SERVICES ON CROP YIELD AMONG SMALLHOLDER FARMERS IN GWER WEST, BENUE STATE

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Abstract

This study examined the effect of mobile phone-based agricultural information services on crop yield among smallholder farmers in Gwer West Local Government Area, Benue State, Nigeria. Anchored on the Technology Acceptance Model, the study adopted a descriptive survey design, drawing a sample of 154 smallholder farmers from which 143 valid responses were obtained, representing a 92.9% response rate. Data were collected using a structured questionnaire and analyzed using frequency counts, percentages, mean and standard deviation, with a criterion mean of 2.50 as the decision benchmark. Findings revealed that respondents were predominantly middle-aged, male and secondary-educated, operating farms of one to four hectares. Farmers accessed mobile phone-based agricultural information services, particularly on improved seeds and planting techniques, weather updates and pest and disease control, to a high extent (cluster mean = 2.73). Results further showed that these services had a strong positive effect on crop yield (cluster mean = 3.09), enhancing planting decisions, adoption of improved practices and overall farm productivity. However, poor network coverage, high data costs and limited digital skills emerged as significant constraints (cluster mean = 3.05) limiting effective utilization. The study concludes that mobile phone-based agricultural information services substantially improve crop yield among smallholder farmers but recommends that telecommunications infrastructure be strengthened and data costs reduced to maximize their benefits in the study area.

Keywords: Mobile phone-based agricultural information services, Crop yield, Smallholder farmers, Gwer West, Benue State

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Introduction

Agriculture remains the backbone of many developing economies and its capacity to feed growing populations increasingly depends on how effectively farmers access and apply timely information. The global food system is undergoing rapid transformation as automation and digital tools reshape the way agricultural knowledge reaches producers, with technology-driven interventions now considered central to productivity and resilience (Food and Agriculture Organization, 2022). Nigeria's extension architecture, however, has struggled to keep pace: Madukwe (2018) notes that extension delivery continues to face inadequate staffing, funding and rural coverage, leaving many smallholder farmers without consistent guidance on planting, pest management and post-harvest practices.

Mobile phone technology has emerged as an alternative channel capable of bridging this gap, offering a low-cost, scalable means of reaching dispersed rural populations with weather updates, market prices and crop management advice (Baumüller, 2018), even though evidence on its actual utility for smallholder farmers remains fragmented. Recent initiatives illustrate the practical shape this innovation is taking in Nigeria: Precision Development (2026) reports a digital precision extension platform delivering tailored agronomic advice through mobile channels, while the United Nations Development Programme (2025) describes efforts pairing mobile communication with localized weather infrastructure. These interventions signal a broader momentum toward digital solutions, but their success ultimately hinges on whether farmers adopt and use them.

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Adoption of mobile agricultural tools is shaped by a complex mix of socioeconomic and behavioural factors. Mittal and Mehar (2016) show that uptake of such technologies in India is closely tied to education, income and farm size, a pattern echoed by Kolapo and Didunyemi (2024) in Southwest Nigeria, where smartphone exposure was linked to gains in farm-level efficiency and reinforced by Muromba, Keeni and Fuyuki (2025) across Sub-Saharan Africa, where perceived usefulness and ease of use remain central determinants of adoption. Kouandou and Laajimi (2025) similarly find, using nationally representative Nigerian household data, that smartphone ownership raises the likelihood of hiring labour and adopting phytosanitary inputs and mechanisation.

In Benue State, where agriculture sustains most rural livelihoods, this potential is increasingly threatened by insecurity that disrupts farming activity and its supporting infrastructure, as Vanguard Newspaper (2025) illustrates with respect to a major dam elsewhere in the country. Despite this growing literature, there remains limited empirical understanding of how mobile tools translate into actual yield outcomes for smallholder farmers in specific local government areas such as Gwer West. Addressing this gap calls for a methodologically sound approach capable of isolating the effect of mobile-based information services from other confounding factors (Creswell & Creswell, 2018; Gujarati & Porter, 2009), which is the task of the present study.

Statement of the Problem

Smallholder farmers should have consistent access to timely agricultural information that allows them to make informed decisions on planting, input use, pest control and harvesting, ultimately translating into higher crop yields and improved

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household food security. However, the conventional extension system in Nigeria remains grossly inadequate, with too few extension agents to cover the vast number of rural farming households. Many smallholder farmers, particularly those in remote local government areas such as Gwer West, rarely receive direct contact with extension officers and instead rely on informal sources, traditional practices or trial and error. Mobile phone-based agricultural information services have emerged as a potential substitute, yet their adoption and actual usage remain inconsistent and it is unclear whether the information reaching farmers, when it does reach them, is being effectively applied on the farm.

The consequence is that many smallholder farmers in Gwer West continue to record low and unstable crop yields despite the increasing availability of mobile technology, leaving them vulnerable to avoidable losses from pests, diseases, adverse weather and missed market opportunities. If this gap between technological availability and effective utilization is not properly understood and addressed, the broader goal of improving food security and rural livelihoods through mobile-enabled extension will remain unmet. It is against this background that the present study investigates the effect of mobile phone-based agricultural information services on crop yield among smallholder farmers in Gwer West, Benue State.

Research Questions

The broad objective of this study is to examine the effect of mobile phone-based agricultural information services on crop yield among smallholder farmers in Gwer West Local Government Area, Benue State. Specifically, the study seeks to answer the following research questions:

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1. What are the socioeconomic characteristics of smallholder farmers in the study area?
2. What types of mobile phone-based agricultural information services are accessed by smallholder farmers in the study area?
3. What is the effect of mobile phone-based agricultural information services on crop yield among smallholder farmers in the study area?
4. What are the constraints faced by smallholder farmers in accessing and utilizing mobile phone-based agricultural information services in the study area?

Theoretical Framework

This study is anchored on the Technology Acceptance Model (TAM) originally proposed by Davis (1989), which explains how individuals come to accept and use a given technology. The model holds that adoption is driven by two core beliefs: perceived usefulness, the degree to which a person believes a technology will improve their performance and perceived ease of use, the degree to which they believe using it will be free of effort. Together, these beliefs shape attitude toward the technology, which in turn influences behavioural intention and actual usage. Applied to this study, TAM helps explain why smallholder farmers in Gwer West adopt or fail to adopt, mobile phone-based agricultural information services. Farmers who perceive a clear link between mobile information and improved farm outcomes, such as better pest control or favourable market timing, are more likely to use these services, while those who find the platforms difficult to navigate, often due to limited literacy or unfamiliarity with mobile technology, are less likely to adopt them regardless of potential benefits. Factors

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such as affordability of devices and data, clarity of the information delivered and farmers' digital literacy further shape this adoption process. The framework thus guides the study in examining how farmers' perceptions of usefulness and ease of use influence their uptake of mobile-based information services and how this uptake translates into measurable effects on crop yield among smallholder farmers in Gwer West, Benue State.

Conceptual Review

Mobile Phone

A mobile phone is a portable communication device that, beyond voice calls and text messaging, has evolved into a multifunctional tool for information access, financial transactions and social networking. Rogers (2003), through the Diffusion of Innovations theory, explains that the spread of such technologies within social systems is shaped by an innovation's relative advantage, compatibility, complexity, trialability and observability. In the agricultural context, Aker (2011) conceptualizes the mobile phone as a low-cost, widely accessible ICT capable of bridging the information gaps that have historically limited farmers' access to extension services, while Baumüller (2018) similarly describes it as an affordable, portable platform through which market information, weather alerts and agronomic advice are increasingly delivered to smallholder farmers.

Agriculture

Agriculture refers to the deliberate cultivation of crops and rearing of livestock for food, income and raw materials and remains the backbone of many developing economies, including Nigeria's, even as its productivity continues to be constrained by

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weak extension delivery systems, inadequate funding and poor farmer-to-extension-agent ratios (Madukwe, 2018), which underscores the growing relevance of ICT-based interventions such as mobile phone-enabled advisory services. Within this system, smallholder farmers, households typically operating on landholdings below two hectares with family labour and limited capital, are the central actors, yet remain disproportionately vulnerable to production risks due to limited access to resources, credit and information (Food and Agriculture Organization, 2022). Their willingness to adopt mobile agricultural tools is shaped mainly by perceived usefulness and ease of use (Muromba, Keeni & Fuyuki, 2025) and such adoption has been linked to reductions in post-harvest losses (Kehinde & Ayanwale, 2025). The outcome by which this adoption is ultimately judged is crop yield, the quantity of produce harvested per unit area and a key indicator of farm-level productivity and food security. A growing body of Nigerian evidence links digital information access to improvements in this outcome (Kolapo & Didunyemi, 2024; Abioye et al., 2025; Kouandou & Laajimi, 2025), supporting the view that crop yield among smallholder farmers is shaped not only by natural and input-based factors but also by access to and utilization of, timely information, which is the relationship this study examines.

Information Services

Information services, within the agricultural context, refer to the systematic provision of timely, relevant and actionable knowledge, covering weather, market prices, improved inputs and pest and disease control, to support farmers' decision-making. Aker (2011) argues that ICT-based information services reduce the transaction costs of acquiring agricultural knowledge, particularly for farmers in remote areas,

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while Mittal and Mehar (2016) note that farmers' education, income and landholding size shape their ability to access and use such services. Nwafor, Eze and Okoye (2021) further observe that conventional extension delivery in Nigeria is beset by inadequate staffing, poor logistics and insufficient funding, reinforcing the case for digital services as a scalable complement to face-to-face extension. Institutional initiatives such as the Digital Precision Agricultural Extension (DPAE) platform (Federal Ministry of Agriculture and Food Security, 2026; Precision Development, 2026) exemplify efforts to formalize and scale such mobile-based advisory delivery in Nigeria.

Review of Empirical Studies

A number of recent Nigerian studies have examined mobile technology and agricultural outcomes. Abioye et al. (2025), using propensity score matching on a sample of 795 smallholder rice farmers in Ebonyi State, found that adoption of the RiceAdvice mobile advisory application raised rice yields by an average of 1,907.83 kg per hectare, a gain of roughly 79%, with training, access to extension services and smartphone ownership emerging as the strongest predictors of adoption. Kolapo and Didunyemi (2024), surveying 380 farmers across Oyo and Osun States in Southwest Nigeria, found that exposure to agricultural smartphone applications significantly increased both adoption and the total factor productivity and technical efficiency of the farmers who used them. Alhassan, Babangida, Hassan and Muhammad (2023), surveying 127 farmers in Karaye Local Government Area, Kano State, found that herbicide-control information was the type most accessed through mobile phones and only on a monthly or occasional basis. Amonjenu and Wombo (2016), studying 106 vegetable farmers and 55 extension agents in Benue State, identified 24 sources, 8

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challenges and 7 mitigation strategies relating to farmers' access to agricultural innovations.

Collectively, these studies confirm that mobile phone-based information services are increasingly central to agricultural practice across Nigeria and that network coverage, cost and digital literacy are recurring constraints to their use. However, none of them specifically determined the effect of mobile phone-based agricultural information services on crop yield or the constraints to such services, among smallholder farmers in Gwer West Local Government Area, Benue State, using a descriptive survey of the scale adopted in this study. This is the gap that the present study addresses.

Research Methodology

A descriptive survey research design was adopted for the study on the effect of mobile phone-based agricultural information services on crop yield among smallholder farmers in Gwer West Local Government Area, Benue State. The study was conducted in Gwer West Local Government Area of Benue State, Nigeria, where agriculture constitutes an important livelihood activity among rural households. The population of the study comprised smallholder farmers in the study area, from which a sample of 154 smallholder farmers was selected using an appropriate sampling procedure to ensure adequate representation of farmers across the study area. Data were collected using a structured questionnaire titled the "Mobile Phone-Based Agricultural Information Services and Crop Yield Questionnaire (MPAIS-CYQ)", which covered the socioeconomic characteristics of respondents, the types of mobile phone-based agricultural information services accessed, the effect of mobile phone-based agricultural

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information services on crop yield and the constraints affecting access to and utilization of the services among smallholder farmers.

Items on the types of mobile phone-based agricultural information services accessed were measured using a four-point scale of Very Often (VA), Often (O), Rarely (R) and Never (N), while items on the effect of mobile phone-based agricultural information services on crop yield and constraints to accessing and utilizing the services were measured using Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD). The instrument was subjected to face and content validation by experts in Agricultural Extension, Agricultural Economics and Measurement and Evaluation and their observations were used to improve the clarity, relevance and adequacy of the questionnaire items. The reliability of the instrument was established through a pilot test and an appropriate reliability analysis to determine its internal consistency. The researchers administered the questionnaires with the assistance of trained research assistants over a period of three weeks. A total of 154 questionnaires were distributed to the selected smallholder farmers, out of which 143 were properly completed and returned, representing a response rate of approximately 93%, while 11 questionnaires, representing approximately 7%, were not returned. Data collected were analyzed using frequency counts, percentages, mean and standard deviation. A criterion mean of 2.50 was used as the decision point for the four-point scales.

Results and Discussion

This section presents the results of the study alongside the discussion of findings organized according to the research questions that guided the study.

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Response Rate

A total of 154 copies of the questionnaire were distributed to the sampled smallholder farmers in the study area. Table 1 presents the distribution and return rate of the questionnaires.

Table 1

Distribution and Return Rate of Questionnaires

S/N	Description	Frequency	Percentage (%)
1	Number of questionnaires distributed	154	100
2	Number of questionnaires returned	143	92.9
3	Number of questionnaires not returned	11	7.1
	Total	**154**	**100**

Table 1 indicates that a total of 154 questionnaires were distributed to smallholder farmers in the study area, representing 100% of the study sample. Out of this number, 143 questionnaires were properly completed and returned, giving a response rate of 92.9% (approximately 93%), while 11 questionnaires, representing 7.1%, were not returned. The high response rate suggests strong participation among the respondents and provides an adequate basis for the analysis. Consequently, the 143 returned questionnaires were considered sufficient for analysing the effect of mobile phone-based agricultural information services on crop yield among smallholder farmers in Gwer West Local Government Area, Benue State.

Research Question One

What are the socioeconomic characteristics of smallholder farmers in the study area?

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Table 2

Socioeconomic Characteristics of Respondents

S/N	Socioeconomic Variable	Response Option	Frequency	Percentage (%)
1	Age	Below 30 years	18	12.6
		30-39 years	32	22.4
		40-49 years	39	27.3
		50-59 years	34	23.8
		60 years and above	20	14.0
2	Gender	Male	91	63.6
		Female	52	36.4
3	Educational level	No formal education	12	8.4
		Primary education	31	21.7
		Secondary education	60	42.0
		Tertiary education	40	28.0
4	Farming experience	Below 5 years	20	14.0
		5-10 years	36	25.2
		11-15 years	35	24.5
		16-20 years	30	21.0
		20 years and above	22	15.4
5	Farm size	Below 1 hectare	28	19.6
		1-2 hectares	45	31.5
		3-4 hectares	39	27.3
		5-6 hectares	20	14.0
		Above 6 hectares	11	7.7
	Total		**143**	**100**

Table 2 presents the socioeconomic characteristics of the smallholder farmers who participated in the study. The findings showed that respondents aged 40-49 years constituted the largest age group, with 39 respondents (27.3%), followed by those aged 50-59 years with 34 respondents (23.8%) and those aged 30-39 years with 32

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respondents (22.4%). Respondents aged below 30 years accounted for 18 (12.6%), while those aged 60 years and above accounted for 20 (14.0%).

In terms of gender, 91 respondents (63.6%) were male, while 52 (36.4%) were female. With respect to educational level, respondents with secondary education constituted the largest group with 60 respondents (42.0%), followed by those with tertiary education with 40 respondents (28.0%). Respondents with primary education accounted for 31 (21.7%), while 12 (8.4%) had no formal education.

Regarding farming experience, respondents with 5-10 years of farming experience constituted the largest group with 36 respondents (25.2%), closely followed by those with 11-15 years with 35 respondents (24.5%). Those with 16-20 years accounted for 30 (21.0%), while 22 (15.4%) had more than 20 years of farming experience and 20 (14.0%) had less than five years of experience.

In terms of farm size, farmers cultivating 1-2 hectares constituted the largest group with 45 respondents (31.5%), followed by those cultivating 3-4 hectares with 39 respondents (27.3%). Farmers with farms below one hectare accounted for 28 (19.6%), while 20 (14.0%) cultivated 5-6 hectares and 11 (7.7%) cultivated above six hectares. The distribution indicates that the respondents were predominantly smallholder farmers operating relatively small farm holdings, which is broadly consistent with the profile of smallholder farmers described in the conceptual review and suggests a population well-positioned to benefit from accessible, mobile-based information interventions.

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Research Question Two

What types of mobile phone-based agricultural information services are accessed by smallholder farmers in the study area?

Table 3: *Types of Mobile Phone-Based Agricultural Information Services Accessed*

S/N	Item	VA	O	R	N	Mean (x̄)	SD
1	Weather and climate information	42	45	35	21	2.76	1.04
2	Information on improved seeds and planting techniques	48	47	30	18	2.87	1.02
3	Information on pests, diseases and their control	38	46	37	22	2.70	1.03
4	Information on fertilizer application and soil management	35	44	39	25	2.62	1.04
5	Agricultural market prices and marketing information	40	43	36	24	2.69	1.06
	Cluster Mean					**2.73**	

VA = Very Often (4), O = Often (3), R = Rarely (2), N = Never (1)

Table 3 presents the types of mobile phone-based agricultural information services accessed by smallholder farmers in the study area. The findings showed that information on improved seeds and planting techniques recorded the highest mean score of 2.87, followed by weather and climate information with a mean score of 2.76 and information on pests, diseases and their control with a mean score of 2.70. Agricultural market prices and marketing information recorded a mean score of 2.69, while information on fertilizer application and soil management recorded the lowest mean score of 2.62. All the items recorded mean scores above the criterion mean of 2.50, indicating that the respondents accessed the listed mobile phone-based agricultural information services to a relatively high extent. The cluster mean of 2.73 indicated that, overall, smallholder farmers accessed mobile phone-based agricultural

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information services to a high extent. The standard deviation values, which ranged from 1.02 to 1.06, indicated variations in the respondents' ratings.

This finding aligns with Kolapo and Didunyemi (2024), who found that exposure to agricultural smartphone applications significantly increased their use among farmers in Southwest Nigeria and with Abioye et al. (2025), who similarly found smartphone ownership to be a strong predictor of mobile advisory uptake in Ebonyi State. However, the finding contrasts with Alhassan, Babangida, Hassan and Muhammad (2023), who found usage in Kano State occurring only monthly or occasionally and centred narrowly on herbicide-control information. This divergence suggests that the extent and pattern of mobile phone use for agricultural information is shaped by local infrastructural and contextual factors rather than being uniform across Nigeria.

Research Question Three

What is the effect of mobile phone-based agricultural information services on crop yield among smallholder farmers in the study area?

Table 4: *Effect of Mobile Phone-Based Agricultural Information Services on Crop Yield*

S/N	Item	SA	A	D	SD	Mean (x̄)	SD
1	Information received through my mobile phone has helped me increase my crop yield.	60	52	20	11	3.13	0.93
2	Mobile phone-based agricultural information has helped me adopt improved farming practices that increase crop production.	57	55	21	10	3.11	0.90
3	Weather information received through my mobile phone has helped me make better decisions about planting and harvesting.	53	54	25	11	3.04	0.93
4	Pest and disease management	55	50	27	11	3.04	0.94

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S/N	Item	SA	A	D	SD	Mean (x̄)	SD
	information received through my mobile phone has helped to reduce crop losses.						
5	Mobile phone-based agricultural information has improved my overall farm productivity.	59	51	23	10	3.11	0.92
	Cluster Mean					**3.09**	

SA = Strongly Agree (4), A = Agree (3), D = Disagree (2), SD = Strongly Disagree (1)

Table 4 presents respondents' views on the effect of mobile phone-based agricultural information services on crop yield among smallholder farmers in the study area. The findings showed that information received through mobile phones has helped farmers increase their crop yield recorded the highest mean score of 3.13, followed by the adoption of improved farming practices and improvement in overall farm productivity, both with mean scores of 3.11. Weather information received through mobile phones and pest and disease management information each recorded a mean score of 3.04. All the items recorded mean scores above the criterion mean of 2.50, indicating agreement across all the statements. The cluster mean of 3.09 indicated that, overall, respondents agreed that mobile phone-based agricultural information services have a positive effect on crop yield and farm productivity. The standard deviation values, which ranged from 0.90 to 0.94, indicated variations in the respondents' ratings.

This finding is consistent with Abioye et al. (2025), who documented a yield gain of roughly 79% among adopters of a mobile rice-advisory application in Ebonyi State and with Kolapo and Didunyemi (2024), who found that exposure to agricultural smartphone applications raised the total factor productivity and technical efficiency of farmers in Southwest Nigeria. It also reinforces Amonjenu and Wombo (2016), whose

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accessibility findings for vegetable farmers in Benue State similarly implied productivity benefits. The convergence of evidence across Ebonyi, Oyo, Osun and Benue States lends strong support to the position that mobile phone-based information services are a genuine productivity-enhancing intervention, strengthening the generalizability of this study's conclusions for Gwer West Local Government Area.

Research Question Four

What are the constraints faced by smallholder farmers in accessing and utilizing mobile phone-based agricultural information services in the study area?

Table 5: *Constraints to Accessing and Utilizing Mobile Phone-Based Agricultural Information Services*

S/N	Item	SA	A	D	SD	Mean (x̄)	SD
1	Poor mobile network coverage in the farming communities	64	51	19	9	3.19	0.90
2	High cost of mobile data and airtime	58	55	20	10	3.13	0.90
3	Limited knowledge and skills in using mobile phones for agricultural information	50	56	25	12	3.01	0.93
4	Difficulty in understanding or interpreting agricultural information received through mobile phones	45	55	29	14	2.92	0.95
5	Inadequate access to reliable and timely agricultural information through mobile phones	52	54	25	12	3.02	0.94
	Cluster Mean					**3.05**	

SA = Strongly Agree (4), A = Agree (3), D = Disagree (2), SD = Strongly Disagree (1)

Table 5 presents the constraints affecting smallholder farmers' access to and utilization of mobile phone-based agricultural information services in the study area. The findings showed that poor mobile network coverage in the farming communities

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recorded the highest mean score of 3.19, followed by the high cost of mobile data and airtime with a mean score of 3.13. Inadequate access to reliable and timely agricultural information recorded a mean score of 3.02, while limited knowledge and skills in using mobile phones for agricultural information recorded a mean score of 3.01. Difficulty in understanding or interpreting agricultural information received through mobile phones recorded the lowest mean score of 2.92. All the items recorded mean scores above the criterion mean of 2.50, indicating agreement across all the listed constraints. The cluster mean of 3.05 indicated that, overall, respondents agreed that these factors constitute constraints to accessing and utilizing mobile phone-based agricultural information services. The standard deviation values, which ranged from 0.90 to 0.95, indicated variations in the respondents' ratings.

This finding aligns closely with Nwafor, Eze and Okoye (2021), who identified inadequate staffing, poor logistics and insufficient funding as constraints on conventional extension delivery in Nigeria and with Abioye et al. (2025), whose regression results showed smartphone ownership and access to extension services as significant determinants of mobile advisory uptake in Ebonyi State. It also resonates with Amonjenu and Wombo (2016), who identified eight distinct challenges limiting farmers' access to agricultural innovations in Benue State. Notably, difficulty interpreting information was the lowest-rated constraint in this study, suggesting that once network and cost barriers are addressed, farmers in Gwer West are reasonably capable of understanding and applying the information they receive. This reinforces the view that infrastructural and economic factors, rather than literacy or interest, remain

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the primary obstacles to fully realizing mobile technology's benefits in Nigerian agriculture.

Recommendations

Based on the findings of this study, the following recommendations are made:

1. **Socioeconomic Characteristics:** Extension programs and mobile advisory platforms should be tailored to the predominantly secondary-educated, middle-aged smallholder farmers in the area to ensure content is accessible and relevant to their literacy and experience levels.

2. **Types of Information Services Accessed:** Service providers and government agencies should expand mobile content on fertilizer application and soil management, which recorded the lowest access, to ensure farmers receive balanced information across all key agronomic areas.

3. **Effect on Crop Yield:** Agricultural stakeholders should scale up mobile-based advisory services, given their demonstrated positive effect on crop yield, by integrating them formally into existing extension delivery systems in Benue State.

4. **Constraints to Access and Utilization:** Telecommunications companies and relevant government agencies should prioritize improving network infrastructure and reducing data costs in rural farming communities, as these were identified as the most severe barriers to effective utilization of mobile agricultural information services.

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Conclusion

This study examined the effect of mobile phone-based agricultural information services on crop yield among smallholder farmers in Gwer West Local Government Area, Benue State and found that farmers were predominantly middle-aged, male, moderately educated and operated small farm holdings of between one and four hectares, reflecting a population well-positioned to benefit from mobile-based interventions. The findings established that farmers accessed mobile phone-based agricultural information services, particularly on improved seeds, weather and pest control, to a high extent and that these services had a strong positive effect on crop yield by supporting better planting decisions, improved practice adoption and reduced crop losses. However, this potential is significantly undermined by constraints such as poor network coverage, high data costs and limited digital skills, which remain the primary barriers to fully realizing the benefits of mobile technology in the study area. Overall, the study concludes that mobile phone-based agricultural information services are a valuable and effective tool for enhancing crop yield among smallholder farmers in Gwer West, but their full potential can only be achieved when the infrastructural and economic constraints limiting access are adequately addressed.

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