



COMPETENCY LEVEL AND TRAINING NEEDS OF PUBLIC AGRICULTURAL EXTENSION PERSONNEL ON E-AGRICULTURAL EXTENSION IN KEBBI STATE, NIGERIA

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ABSTRACT

E-extension refers to the use of ICT tools to disseminate useful agricultural information to farmers. This study assessed the competency level and training needs of public agricultural extension personnel regarding e-extension in Kebbi State, Nigeria. The specific objective was to examine the level of knowledge and competence of extension personnel in e-agricultural extension within the state. A validated and pre-tested questionnaire was used to collect data from respondents. A multistage sampling procedure was employed to select 66 respondents. Descriptive statistics such as frequency counts, percentages, and mean scores were used to summarize the data, while binary logistic regression was used for inferential analysis. Findings revealed that respondents were knowledgeable about e-extension, with high agreement that the use of e-extension methods would ease the workload of extension workers ($\bar{x} = 4.53$), and that effective agricultural extension initiatives require internet-based communication ($\bar{x} = 4.42$). However, extension personnel demonstrated low competence in several key areas: using online web portals to disseminate agricultural information ($\bar{x} = 1.40$), using email to reach farmers ($\bar{x} = 1.39$), using smartphones ($\bar{x} = 2.42$), and utilizing websites to communicate, create, disseminate, and manage agricultural information ($\bar{x} = 2.42$). Major constraints identified by respondents included poor access to smartphones by

farmers ($\bar{x} = 3.92$), farmers' poverty ($\bar{x} = 3.86$), poor working conditions ($\bar{x} = 3.62$), and inadequate government support for e-extension ($\bar{x} = 3.60$). The binary logistic regression analysis indicated that household size significantly influenced respondents' competency in e-extension. In conclusion, the study highlights a pressing need for training programs to enhance the knowledge and competency levels of extension personnel in e-extension. It is recommended, among other things, that targeted training be provided to equip extension staff with the necessary skills to adopt and implement e-extension effectively in response to contemporary agricultural challenges.

Keywords: E-agricultural extension, personnel, training needs, Knowledge, Competency level

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INTRODUCTION

Agricultural extension has been the primary route of disseminating valuable and proven practices to farming households. The advent of the coronavirus pandemic has necessitated the use of information and communication technology (ICT), commonly known as e-extension. Therefore, e-extension is the deployment of ICT to disseminate agricultural extension messages to the clientele (Amruta & Vasanthi, 2025). Additionally, e-extension is a delivery system that harnesses the power of ICT, such as web tools that aid online sharing, collaboration, and networking (Singh *et al.* 2023). According to the Philippines e-extension portal (2012), E-extension is viewed as a network of institutions that offers a more effective substitute for traditional agricultural practice. Priya, Sivanarayana, & Babu, (2025) argued that modern means of communication, called e-extension, can improve the efficiency and effectiveness of extension advisory services. Sirajuddin (2019) posited that e-extension is a cooperatively created internet-based environment that may be used as an electronic tool to give thorough and current information on farming and improve in-person and paper-based transactions. Furthermore, ICTs are veritable tools for sharing information about commodity prices and better marketing decisions (Mukhebi *et al.*, 2019). Ferris, Robbins, Best, Seville, Buxton, Shriver & Wei, (2014), believe that ICT can offer farmers unlimited access to global markets, where monetary value and volume of sales reflect the value of products. Consequent to the above, with e-extension, more farming families can be reached with helpful information. The reality before agricultural extension personnel who acquaint themselves with ICT knowledge is to reach their target audience effectively.

The agricultural sector in Nigeria plays a critical role in sustaining livelihoods and food security, with public agricultural extension services serving as a critical mechanism for disseminating knowledge and technologies to farmers. However, the shift towards e-agricultural extension, which leverages digital technologies to enhance the reach and efficiency of extension services, has introduced new competency requirements for extension personnel. In Kebbi State, there is limited understanding of the current competency levels of public agricultural extension personnel concerning e-agricultural extension. Additionally, the specific training needs of these personnel to effectively deliver e-extension services have not been thoroughly investigated. This research is significant as this problem hinders the ability of the extension system to adapt to the evolving technological landscape and provide farmers with the necessary support for

improved agricultural productivity and incomes. Addressing this research problem is crucial for developing targeted capacity-building interventions that equip public agricultural extension personnel in Kebbi State with the necessary knowledge, skills, and tools to leverage digital technologies and deliver high-quality e-extension services to farmers. It, in turn, can enhance the overall effectiveness and impact of the agricultural extension system in the State.

The coronavirus pandemic has impacted the state's agricultural industry, which is notable given the beneficial role that agricultural extension has played in the growth of agricultural production. The pandemic has affected the way people interact and socialise. The competency level and training of public agricultural extension personnel in the Kebbi Agricultural and Rural Development Authority has not been conducted before. The general objective of the study was to assess the competency and training needs of public agricultural extension personnel on e-agricultural extension in agricultural and rural development, Kebbi State, Nigeria. The specific objectives were to;

- i. evaluate the perceived knowledge of e-extension among extension personnel;
- ii. examine the competency level of public extension personnel in the study area;
- iii. identify the training needs of public extension personnel on using e-extension and
- iv. identify the perceived constraints of using e-extension.

METHODOLOGY

The study area

The study was carried out in Kebbi state, Nigeria. The State was created on the 27th of August 1991. Kebbi is between latitudes 10° 8' N- 13° 15'N and 3° 30'E – 6° 30'E. Sokoto and Zamfara States border the state to the east, Niger State to the south, the Benin Republic to the west, and the Republic of Niger to the north. With a population of about 3,238,628 (National Population Commission, 2006), the population was projected to be 3,952,766 in 2012 (United Nations Parliamentary Assembly, 2012). Kebbi State occupies a land area of 36,229 square kilometres. Major cities include Argungu, Jega, Koko, Yauri, and Zuru. It has twenty-one local government areas.

Sampling technique

The target demographic was made up of agricultural extension workers of the Kebbi Agricultural and Rural Development Authority in Kebbi State. A multistage sampling procedure was used to select the respondents for the study. The first stage involves the stratification of Agricultural Development Project (ADP) into four (4), namely, Argungu, Bunza, Zuru and Yauri. In the second stage all the zones were purposively selected and at the third stage proportionate sampling was used select twenty-one (21) respondents from Argungu been the headquarters of Kebbi Agricultural and Rural Development Authority (KARDA) located at Kalgo. Sixteen from Bunza, fifteen from Zuru and fourteen from Yauri making a total of sixty-six (66) respondents for the study.

Data collection

The data collection instrument was developed in English, and data were collected between January and April 2022. Descriptive statistics, including frequency distributions, percentages, and mean scores, were used to summarize the data. Binary logistic regression

analysis was conducted to examine the relationship between respondents' competency levels and their socioeconomic characteristics.

Measurement of Variables

Perceived knowledge was measured using a five-point Likert scale ranging from *strongly agree* (5) to *strongly disagree* (1). The mean scores were categorised as follows: high knowledge (4.00–5.00), moderate knowledge (2.50–3.99), and low knowledge (1.00–2.49). Competency was assessed on a four-point scale ranging from *very competent* (4) to *not competent* (1), with a benchmark mean of 2.5 (i.e., $[4 + 3 + 2 + 1] \div 4 = 2.5$).

Training needs were measured on a three-point scale ranging from *not needed* (1) to *most needed* (3), with a benchmark mean of 2.0 (i.e., $[3 + 2 + 1] \div 3 = 2.0$). Perceived constraints were measured using a five-point Likert scale ranging from *not severe* (1) to *very severe* (5). A benchmark grand mean of 3.0 (i.e., $[1 + 2 + 3 + 4 + 5] \div 5 = 3.0$) was used to categorise constraints as either *not severe* (< 3.0) or *severe* (≥ 3.0).

RESULTS AND DISCUSSION

Perceived knowledge about e-extension among extension personnel

The public extension personnel's perceived knowledge of e-extension is presented in Table 1. The results show that public extension personnel in Kebbi State have a high level of knowledge regarding e-extension channels, and the tasks of extension workers are perceived to be easier when using e-extension procedures ($\bar{x} = 4.53$). Effective agricultural extension initiatives require internet-based communication ($\bar{x} = 4.42$). Farmers benefit from the dissemination of agricultural information via websites ($\bar{x} = 4.33$), and using mobile phones and SMS to contact farmers is considered effective ($\bar{x} = 4.22$). E-extension also helps save time and money in reaching out to farmers ($\bar{x} = 4.19$), among others. This suggests that public extension staff are familiar with a moderate level of e-extension application. But some knowledge areas had the lowest mean scores, such as the belief that e-extension improves the efficiency of extension workers ($\bar{x} = 4.03$) and that mobile phones help in disseminating agricultural information ($\bar{x} = 4.02$).

The implication is that while most public extension personnel possess a basic understanding of e-extension, they demonstrate a low level of competency and express a need for further training. These findings are consistent with those of Vegad, Chauhan, and Vinaya Kumar (2021), who reported that extension professionals had high levels of knowledge of e-extension. Similarly, Mugwanya *et al.* (2023) and Obianefo *et al.* (2022) found that while extension professionals had some knowledge, they lacked competency in certain skills.

Table 1: Perceived Knowledge about E-extension among Extension Personnel

Knowledge statements	%	M	SD
The workload of the extension workers will be reduced by employing E-extension procedures.	59.1	4.53	0.61
Communication over the Internet is required for agricultural extension initiatives to be effective.	48.5	4.42	0.60
Farmers benefit from the dissemination of agricultural information via websites.	50.0	4.33	0.66
Using cell phones and SMS to contact farmers is a good idea.	56.1	4.22	0.11
Using E-extension, you can save money and time when contacting farmers.	62.1	4.19	0.68
The Internet is an effective means of disseminating agricultural information.	51.5	4.13	0.80
The use of E-extension will improve the efficiency of extension workers.	69.7	4.03	0.55
Mobile phones are useful for spreading agricultural information.	42.4	4.02	1.11

Grand mean= 4.23

Source: Field survey, 2022

Competency Level on the Use of E-extension Channels

Table 2 indicates that the use of smartphones ($\bar{x} = 1.98$) was the only e-extension channel in which extension staff demonstrated competence. This suggests that public extension personnel were generally comfortable using smartphones for extension activities. Ovharhe *et al.* (2021) and Egbunonu *et al.* (2017) similarly reported that extension workers commonly used telephones and radio as part of their ICT toolkit but lacked proficiency in computer and internet-based applications. As highlighted respondents exhibited low competency levels across most e-extension tasks. Specifically, they reported poor performance in the use of online web portals to disseminate agricultural information ($\bar{x} = 1.40$), email communication with farmers ($\bar{x} = 1.39$), use of social media platforms such as Facebook, X (formerly Twitter), and WhatsApp ($\bar{x} = 1.34$), use of blogs for teaching modern farming techniques ($\bar{x} = 1.31$), and use of websites to communicate, create, disseminate, and manage agricultural information ($\bar{x} = 1.22$). These findings are consistent with those of Ovharhe *et al.* (2021), who noted that extension workers exhibited low competence in the use of video conferencing tools.

Table 2: Distribution of Respondents based on Competency Level on the Use of E-extension Channels

Competency level	%	M	SD
Use of smartphones	56.1	1.98**	0.81
Use of an online web portal to disseminate agricultural information	66.7	1.40	0.89
Use of email to reach farmers	69.7	1.39	0.69
Use of social media handles such as Facebook, X, and WhatsApp	77.3	1.34	0.69
Use of blogs to teach farmers modern farming techniques	81.8	1.31	0.72
Use the website to communicate, create, disseminate, and manage agricultural information.	5.0	1.22	0.67

Grand mean =1.44**Source:** Field survey, 2022**Training Needs of Public Extension Personnel on the Use of E-extension**

The results in Table 3 show that all respondents expressed a need for training in the use of various e-extension channels. These include the use of smartphones ($\bar{x} = 2.42$); websites to communicate, create, disseminate, and manage agricultural information ($\bar{x} = 2.42$); online web portals for disseminating agricultural information ($\bar{x} = 2.34$); email to reach farmers ($\bar{x} = 2.31$); social media platforms such as Facebook, X (formerly Twitter), and WhatsApp ($\bar{x} = 2.21$); and blogs for teaching modern farming techniques ($\bar{x} = 2.16$). These findings suggest that respondents require training across all aspects of e-extension. Since all the scores were positive, they were rank-ordered, and training programs should be planned based on the channels with the highest mean values, as shown in Table 3. Thus, the higher the mean score, the greater the identified need for training. This result is consistent with the findings of Mugwanya *et al.* (2024), who reported a similar need for capacity building in e-extension competencies among extension personnel.

Table 3: Distribution of Respondents based on Training needs on the Use of E-extension Channels

Training needs	%	M	SD
Use of smartphones	56.1	2.42	0.556
Use the website to communicate, create, disseminate, and manage agricultural information.	50.0	2.42	0.609
Use of an online web portal to disseminate agricultural information	66.7	2.34	0.511
Use of email to reach farmers	69.1	2.31	0.501
Use of social media handles such as Facebook, X, and WhatsApp	77.3	2.21	0.480
Use blogs to teach farmers modern farming techniques.	81.8	2.16	0.450

Source: Field survey, 2022

The results on the perceived constraints of e-extension are presented in Table 4. Of the eight identified constraints, only four were considered major challenges in the study area.

These include poor access to smartphones by farmers ($\bar{x} = 3.92$), poverty among farmers ($\bar{x} = 3.86$), poor conditions of service ($\bar{x} = 3.62$), and inadequate government support ($\bar{x} = 3.60$). Other notable but less critical constraints include inadequate internet facilities ($\bar{x} = 3.37$) and illiteracy of farmers in Western education ($\bar{x} = 3.37$). These findings align with those of Idris, Olanrewaju, Olatinnwob, and Abdulrahman (2024), who reported similar constraints affecting the adoption of e-extension services.

Table 4: Distribution of Respondents based on Perceived Constraints to E-extension Services

Constraints statements	%	M	SD
Poor access to smartphones by farmers.	54.5	3.92***	1.04
The poverty of farmers.	69.7	3.86***	0.83
The poor condition of service.	71.2	3.62**	0.83
Poor government support.	56.1	3.60**	0.74
Inadequate internet facilities.	57.6	3.37*	1.11
Illiteracy of farmers in Western education.	45.5	3.37*	0.90
Poor internet network in rural areas.	47.0	3.06	1.02
High cost of internet data.	34.8	2.86	1.07

Grand mean= 3.33

Source: Field survey, 2022

Relationship between Competency level and Socioeconomic Characteristics of the extension personnel

The results of the binary logistic regression on the determinants of agricultural extension personnel's competency level in e-extension are presented in Table 6. The table shows that household size was statistically significant and negatively related to competency level. The coefficient for household size (-0.957) was significant at the 5.0% level, indicating that as respondents' household size increases, their competency level in e-extension decreases, and vice versa. This may be linked to the fact that respondents with larger household sizes tend to have less time to use ICT devices, which in turn affects their competency level. This finding aligns with the work of Ajuka, Anyiro, and Ijioma (2015), who reported that the use of ICT by extension personnel was influenced by factors such as age, marital status, education level, years of work experience, income, household size, and the effectiveness of extension service delivery.

Table 6: Relationship between Competency Level and Socioeconomic Characteristics of the Respondents

Omnibus tests the model of coefficients.						
Chi-square	Df	Cox & Snell R ²	Nagelkerke R ²	Sig		
26.029	11	0.332	0.727	0.006*		
Variables in the equation						
Variables	B	S. E	Wald	Df	Sig	Exp(B)
Age	0.190	0.197	0.935	1	0.334	1.209
Sex	21.687	10765.132	0.000	1	0.998	2620297161
Marital status	-13.392	10655.663	0.000	1	0.998	0.000
Number of children	1.963	1.245	2.484	1	0.115	7.119
Household size	-1.873	0.903	4.304	1	0.038**	0.154
Number of wives	3.065	2.034	2.269	1	0.132	21.426
Annual income	0.000	0.000	1.341	1	0.174	1.000
Years of working experience	-0.214	0.278	0.592	1	0.442	0.807
Level of education	-0.828	1.341	0.381	1	0.537	0.437
Computer literacy	-0.370	2.948	0.016	1	0.900	0.690
Area of specialisation	-23.058	3698.485	0.000	1	0.995	0.000
Constant	32.812	17389.220	0.000	1	0.998	1.779

**=significant at 5%

CONCLUSION AND RECOMMENDATIONS

The study revealed that most respondents had moderate knowledge of e-extension but demonstrated limited competence in certain aspects, indicating a need for further training. Respondents also perceived the constraints to using e-extension as severe, with a grand mean score of 3. The binary logistic regression results showed that household size was statistically significant in relation to competency in e-extension.

RECOMMENDATIONS

Extension personnel should be trained in all aspects of e-extension to enhance efficiency and effectiveness in service delivery. Both government and non-governmental organizations are encouraged to support efforts aimed at reducing the identified constraints to e-extension adoption in Nigeria.

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