ASSESSING THE ICT-READINESS OF WORKERS IN BENUE STATE AGRICULTURAL AND RURAL DEVELOPMENT AUTHORITY FOR EFFECTIVE EXTENSION SERVICES DELIVERY.

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ABSTRACT

The study evaluated the readiness of extension workers at Benue State Agricultural and Rural Development Authority (BNARDA) to deliver effective extension services in Benue State, Nigeria. The population for this study comprised all 166 extension workers of BNARDA. The study covered all four categories of extension workers in the three agro-ecological zones of the State. A proportionate and random sampling technique was used to select the sample size of 86 respondents, and data were collected using a structured questionnaire. The study's findings indicated that most extension workers were male, in their productive years, and held an HND/B.Sc certificates with considerable work experience. However, constraints such as poor maintenance culture of ICT facilities, high ICT costs, inadequate electricity and telecommunication connectivity, and limited ICT knowledge and skills among others hindered the effective use of internet-based services for agricultural extension. To address these challenges, providing extension workers with ICT devices, free internet connectivity, and training through collaborative efforts between BNARDA management, government agencies, and private organizations is essential, ultimately enhancing agricultural extension services, farmer productivity, and the sector's overall development.

Keywords: ***BNARDA, Extension, Evaluating, and Readiness***

INTRODUCTION

Benue State Agricultural and Rural Development Authority (BNARDA) is one of the Agricultural Development Projects (ADPs) established in every State in Nigeria. BNARDA was established in 1986 with its headquarters in Makurdi. It has three agro-ecological zones, namely: Eastern Zone with its headquarters at Adikpo (comprising seven LGAs); Northern Zone with its headquarters at Gboko (comprising seven LGAs); and Central Zone with its headquarters at Otukpo (comprising nine LGAs). BNARDA is subdivided into forty-six (46) blocks, and each block has eight cells, hence, there are 368 cells. Zonal headquarters are headed by Zonal directors; blocks have Block Supervisors, while cells have Village Extension Agents. BNARDA is the sole government agency that has the mandate to carry out comprehensive agricultural extension delivery services in Benue State.

The revolution in Information and Communication Technology (ICT) in the 21st Century has brought great changes in the manner in which information is being handled and communicated in many organizations. This revolution poses a challenge to organisations as they strive to be abreast with the developmental trends in information management and dissemination. Dada (2006) noted that the revolution in ICT has brought about e-commerce, e-agriculture, e-learning, e-government, etc. Mansour (2013) reported that the application of ICT has led to the emergence of electronic agricultural extension (e-agric extension), while Gichamba *et al.* (2017) observed that

the electronic agricultural extension system enables extension officers to reach out to farmers using more efficient ICT platforms than the traditional system of extension delivery. These ICT platforms can handle a large volume of information and are faster in accessing and disseminating agricultural information. The electronic services that are useful in agricultural communication include: short message service, e-mail, worldwide web, e-library, video-conferencing, e-workshop, teleconferencing or electronic meeting system, electronic marketing, etc.

ICTs have brought great changes in the manner in which information is shared or disseminated, even in rural Africa. Jere and Erastus (2015) reported that rural farmers in Africa have experienced a high uptake of information and communication in recent years with the aid of ICT platforms. Thus, both extension workers and farmers are quickly taking advantage of the opportunities provided by ICTs to access and disseminate agricultural information. Aker (2011) observed that the use of ICT in rural extension is proven to be even more relevant in the context of widespread illiteracy among rural farmers. It is much cheaper and faster for extension workers to disseminate agricultural messages to farmers via ICT platforms in videos, Short Message Service (SMS), voice calls, etc. However, Adesope *et al.* (2019) stated that agricultural extension workers in Nigeria have yet to fully utilise ICT applications to discharge their functions. They opined that for agricultural extension service delivery in Nigeria to be effective, agricultural extension workers must acquire the requisite knowledge and skills necessary for using information technologies. It is against this background that this research work was conducted to assess the ICT readiness of extension workers at Benue State Agricultural and Rural Development Authority (BNARDA) to deliver effective extension services in Benue State, Nigeria.

The specific objectives were to:

1. Describe the socio-economic characteristics of extension workers;
2. Determine the knowledge level and use of ICTs by extension workers to communicate agricultural information;
3. Determine the availability of ICT devices and services to extension workers;
4. Identify the constraints to ICT use by extension workers in BNARDA; and
5. Proffer measures to promote effective use of ICT by Extension workers

METHODOLOGY

The study was carried out on Benue State Agricultural and Rural Development Authority (BNARDA), Benue State, Nigeria. The population for this study comprised all 166 extension workers of BNARDA as of the time of the study, which was the year 2021. Proportionate and random sampling techniques were employed to obtain the sample size for the study. In the first stage, 50% of the staff were selected proportionately at the BNARDA headquarters, zonal offices, blocks, and cells levels to obtain a sample size of 86 respondents comprising 9 management staff, 8 subject-matter specialists, 24 block extension supervisors, and 45 village extension agents. Since human beings are not expressed in fractions, each decimal place was approximated to a whole number (for example, in the first column of Table 1, 50% of 3 is 1.5, which is 2 extension staff.) Random sampling was then applied to collect the data for the study using a structured questionnaire as an instrument. The questionnaire covered the socio-economic characteristics of respondents, knowledge and use of ICTs to carry out agricultural extension activities, availability of ICT facilities, constraints to the use of ICTs and

the strategies for enhancing ICT use by extension staff.

Data collected on the specific objectives of the study were analysed using simple statistical tools such as percentage, frequency, and mean.

The distribution of extension workers and sample size selection is presented in Table 1.

Table 1: Distribution of Extension Workers and Sample Size Selection

Zone	Mgt Staff		SMSs		BESs		VEAs	
	No of Staff	Sample selected	No of Staff	Sample selected	No of Staff	Sample selected	No of Staff	Sample selected
Hqtrs	6	3	4	2	-	-	-	-
Eastern	3	2	4	2	18	9	32	16
Northern	3	2	4	2	13	7	34	17
Central	3	2	4	2	15	8	23	12
Total	15	9	16	8	46	24	89	45

Source: Researcher's computation, 2021

Measurement of Variables

Socio-economic characteristics of the extension staff studied were measured thus: sex was recorded as either male (1) or female (0). To determine age, respondents were asked to provide their actual age in years. Marital status was categorized as Single, Married, Widowed, Separated, or Divorced, and educational level was assessed by asking respondents to indicate their highest level of educational attainment, just to mention but few.

To determine the knowledge level and use of ICTs by extension workers to communicate agricultural information, a simple, structured survey was designed to assess staff knowledge level about ICT Use. A 4-point Likert scale was used to assess the frequency of ICT device and service use by extension staff. The scale ranged from "very often" (4) to "never" (1). Respondents indicated how often they used devices such as mobile phones, desktop publishing, email, and e-library. Devices with a percentage score greater than 50% were considered frequently used, while those with scores between 30% and 50% were considered occasionally used. Devices with scores between 10% and 30% were considered rarely used, and those with scores less than 10% were considered never used.

Constraints to the use of ICT were measured using a three-point Likert-type scale of severe constraints=3, mild constraints =2, and not a constraint at all = 1. The respondents were asked to indicate the extent to which they perceive each variable as a constraint to the use of ICT at BNARDA. Variables with percent scores greater than 40% were viewed as severe constraints, whereas those variables with percent scores between 20-40% were viewed as mild constraints, while those with a percentage less than 20% were considered as not being a constraint at all to the use of ICT by extension workers at BNARDA.

Lastly, the strategies for enhancing the use of ICT by extension workers were achieved by asking extension staff to tick from the list of all the strategies in a questionnaire.

RESULTS AND DISCUSSION

Socio–Economic Characteristics of Respondents

Table 2 presents the socio-economic characteristics of the respondents. The results reveal a gender imbalance, with males comprising 77.90% of the respondents, while females account for 22.10%. This disparity can be attributed to BNARDA's recruitment strategy, which prioritizes hiring more male extension workers to cater to the predominantly male farming communities in Benue State. Research by Ikyaagba *et al.* (2019) supports this notion, indicating a significant male-to-female ratio of approximately 2.8:1 (198 male farmers vs. 71 female farmers) among yam and rice farmers in the state. By recruiting more male extension workers, BNARDA aims to address the specific needs of these male-dominated farming communities

The results in Table 2 showed that all the agricultural extension workers interviewed were 35 years old and above, while the mean age was 48.90 years. This shows an active workforce that may be conversant with ICT, like the younger generation. This result corroborates the findings of Oyedemi *et al.* (2020), who observed that younger individuals are more likely to utilize ICTs for information searching and dissemination compared to older generations.

The results in Table 2 also showed that 43.02 percent of the respondents had Higher National Diploma /Bachelor of Science Degree (HND/B. Sc),34.88 percent had Ordinary National Diploma /National Certificate of Education (OND/NCE), while 12.80 percent had Master of Science (M.Sc). This meets Nigeria's minimum standard of a two or four-year College or Polytechnic Diploma or Bachelor of Science Degree in Agriculture for extension workers. According to the results, the mean work experience is 25.10 years. This means that extension workers at BNARDA have worked for quite a long time. The results further revealed that the majority of the workforce at BNARDA are village extension workers (52.32%) who the least on the organization's organogram but have direct contact with the rural farmers. According to Robbins and Judge (2020, p.255), the organizational structure typically consists of a hierarchical arrangement of positions, with a larger number of employees at the lower levels and fewer at the top.

Table 2: Socio-Economic Characteristics of Respondents

Frequency (n=86)	%	mean	
Sex			
Male	67	77.90	
Female	19	22.10	
Age(years)			
35 – 39	06	6.97	
40 – 44	07	8.14	
45 – 49	29	33.73	48.90 years
50 – 54	40	46.51	
55 – 59	04	4.60	
. Marital status			
Married	83	96.51	
Others	03	3.49	
Level of education			

GCE/SSCE	08	9.30	
OND/NCE	30	34.88	
HND/B. Sc.	37	43.02	
M. Sc.	11	12.80	
Work experience (years)			
15 – 19	10	11.63	
20 – 24	28	32.56	
25 – 29	28	32.56	25.10 years
30 – 34	20	23.25	
Rank/Designation			
Management/directorate staff	09	10.47	
Subject-matter specialists	08	9.30	
Block extension supervisor	24	27.91	
Village extension agents	45	52.32	

Source: Field Survey, 2021.

Areas of ICT where Extension Workers have Knowledge

The results in Table 3 showed Areas of ICT where extension workers have more knowledge and are familiar with. The result showed that the majority (32.56%) of the respondents indicated that they had more knowledge in basic computer applications, i.e., typing and printing in Microsoft Word, which is the elementary stage of computer usage. According to the result, 16.28 percent of the respondents acquired more knowledge in internet applications, while 13.95 percent had more knowledge in both Microsoft Word and internet applications. The result shows that 8.14 percent of the respondents were more knowledgeable in Microsoft Word and computer maintenance, only 3.50 percent indicated that they had knowledge in website design, while a larger proportion (60.47 did not have knowledge in any of the programmes. This finding agrees with Olaolu *et al.* (2018) that many extension workers lack computer operation knowledge, hence, there is a serious need to train them on the use of computers and their applications.

Table 3: Areas of ICT where Extension Workers have Knowledge

Areas of ICTs	Frequency	Percentage (%)
Microsoft Word/applications	28	32.56
Computer maintenance	11	12.80
Internet applications	14	16.28
Website design	03	3.50
Microsoft Word and internet applications	12	13.95
Microsoft Word and computer maintenance	07	8.14
None	52	60.47

* Multiple responses recorded

Source: Field Survey, 2021.

The Use of ICT Devices and Services by Extension Workers

The results of the use of ICT devices and services are presented in Table 4. The majority (60.47 %) of the respondents used mobile telephones very often for agricultural extension activities. This finding is consistent with that of Adesope *et al.* (2013) and

Yekinni & Olaniyi (2013) that mobile telephones are fairly common among agricultural extension workers. According to the result, 44.20 percent of the respondents had never used desktop publishing (typing, printing, etc., on a computer). Computers were absent in most of the agricultural extension offices, especially local government offices. This made them unavailable to agricultural extension workers, and only 12.80 percent of the respondents admitted that they used desktop publishing very often for agricultural extension activities.

Table 4: The Use of ICT Devices and Services by Extension Workers

ICT devices/services	4	%	3	%	2	%	1	%
Mobile phone	52	60.47	21	24.42	09	10.47	04	4.65
Desktop publishing	11	12.80	23	26.74	14	16.28	38	44.20
Personal e-mail	04	4.6	07	8.14	04	4.65	71	82.56
Organization's e-mail	00	-	00	-	02	2.33	84	97.67
Google search	02	2.33	05	5.81	12	13.95	67	77.91
e-Library	00	-	00	-	01	1.16	85	98.84
e-newspapers	03	3.50	23	26.74	07	8.14	53	61.63
e-conferencing	00	-	00	-	00	-	86	100
Video conferencing	00	-	00	-	00	-	86	100

Source: Field Survey, 2021.
Key: 4 = very often, 3 = occasionally, 2 = rarely, 1 = never

This result shows the low use of computers by extension workers for agricultural extension activities. This result agrees with the findings of Ndag *et al.* (2019) that computer illiteracy is quite high among extension workers in Nigeria. The result shows low e-mail use by extension workers, as 82.56 percent of the respondents stated that they did not have personal e-mail addresses. This finding agrees with that of Ilevbaoje *et al.* (2020 that the majority of extension workers did not have e-mail addresses, which have become a vital tool for the development of organizations. They further noted that Nigerian agricultural extension workers must, therefore, be quickly encouraged and trained to appreciate how important email is to their work.

The use of Google search by extension workers to access agricultural information was quite low. The result shows that 77.91 percent of the respondents had never used Google to search for agricultural information. This was mainly due to the absence of internet services in their offices. According to the result, 13.95 percent rarely used Google to search for information, while only 2.33 percent used Google search very often for agricultural extension purposes. This result shows low internet use by extension workers. This means that the opportunities provided by ICTs have not been reasonably utilized by extension workers at BNARDA to enhance access and dissemination of agricultural information. The results show that 98.84 percent and 61.63 percent of the respondents had never used an e-library, e-magazine, or e-newspaper for agricultural extension purposes. Extension workers did not have access to these internet services because internet services were not provided in BNARDA offices, and secondly, they were not trained in internet applications. Information on the internet is retrievable, such that agricultural extension workers can have access to it anytime they need it. The Internet is a reliable, comprehensive, and

cost-effective means of accessing relevant and current information.

The result shows that none of the respondents had ever participated in e-conferencing and e-video conferencing sessions for agricultural extension purposes. This was due to the fact that ICT facilities that would support these services were absent at BNARDA. If these electronic services are adopted by agricultural organizations, especially the ADPs, extension workers will have the opportunity to interact live with agricultural experts from various fields of agriculture. Thus, extension workers can receive training live, watch demonstrations of innovations live, contribute or ask questions in the comfort of their offices or homes on the computer or even mobile phones. This shall minimize the frequency of physical meetings and reduce the cost of moving materials and people for meetings. Above all, it will ensure fast and efficient dissemination of agricultural information, which is the hallmark of agricultural extension.

Availability of ICT Facilities and trainings for Extension Workers

The results on the availability of ICT facilities and training for extension workers are presented in Table 5. The result shows that the majority (75.58 percent) of the respondents did not have computers in their offices, while 24.42 percent admitted that their offices had computers. Out of those that their offices had computers, only 5.81 percent stated that their computers were linked to the internet. Further results from Table 5 on the training of extension workers revealed that 86.05% of extension staff at BNARDA have not received training on the use of ICT and internet services to disseminate agricultural information, though a greater number of the staff (96.50%) indicated interest in ICT training. This result is not encouraging for the agricultural extension delivery system in modern times, when the internet is fast becoming the most widely used and reliable medium of communication globally. The unavailability of ICT facilities and the lack of training of extension staff is capable of hindering the effective delivery of extension services to the clientele.

The result also showed that only 32.56 percent of the respondents were computer-literate, while 67.44 percent were computer-illiterate. According to the result, only 12.80 percent were internet-compliant, while 87.20 percent were not internet-compliant. This finding agrees with the submission of Yekinni & Olaniyi (2007) that computer illiteracy is an indication of low e-readiness of the agricultural extension practitioners in Nigeria.

Table 5: Availability of ICT Facilities and Training Held for Extension Workers

ICT facilities/trainings	Yes	%	No	%
Extension workers who have computers in their offices	21	24.42	65	75.58
Extension workers whose office computers are connected to the internet	05	5.81	81	94.19
Extension workers who are computer literate	28	32.56	58	67.44
Extension workers who are internet compliant	11	12.80	75	87.20
Extension workers trained				

in ICTs by BNARDA	12	13.95	74	86.05
Extension workers who are interested to have training in ICTs	83	96.50	03	3.50

Source: Field Survey, 2021.

Constraints to ICT Use by Agricultural Extension Workers

The constraints to ICT use by extension workers in BNARDA are presented in Table 6. The results generally showed that all the constraints severely affected the use of ICT by the staff of BNARDA to deliver extension services. The overwhelming majority (97.67%) of the respondents indicated that poor maintenance of ICT devices, e.g., computers, was the most severe constraint. Affecting the use of ICT by extension staff. The result also revealed that (90.70 %) of the respondents indicated that the high cost of ICT devices and services, like computers and the internet, were severe constraints hindering the use of ICTs in BNARDA. This finding agrees with the findings of Ozor (2007), who reported that computers and internet services are expensive in developing nations. This makes it difficult for agricultural organizations like ADPs to adopt and sustain them for use by their employees. Similarly, 94.20 percent of the respondents indicated that poor electricity supply and poor telecommunication connectivity were among the severe constraints to ICT use. This finding agrees with that of Ozor (2007) that poor infrastructure, especially telecommunication and electricity, constituted a limitation to the adoption of ICTs in developing countries.

The majority (73.26 %) of the respondents agreed that inadequate experts in ICTs were also a major constraint to modern ICT use in BNARDA. This result is consistent with the finding of Maru & Valeria (2008) that there is a shortage of skilled manpower in ICTs, especially in agricultural organizations in developing countries.

Table 6: Constraints to ICT Use by Extension Workers

Constraints	Severe constraint (3)	%	Mild Constraint (2)	%	Not at all (1)	%
High cost of ICT devices and services e.g. computers and the internet	78	90.70	03	3.50	05	5.80
Absence of ICT devices and services in BNARDA	72	83.73	04	4.65	10	11.62
Poor infrastructure e.g. poor electricity supply, poor telecom connectivity	81	94.20	00	-	05	5.80
Inadequate ICT experts especially in BNARDA	63	73.26	21	24.42	02	2.33
Poor maintenance of ICT devices e.g. computers etc.	84	97.67	02	2.33	00	-
Low/no interest in ICT training by management of BNARDA	75	87.21	04	4.65	07	8.14
High fees for ICT trainings	77	89.53	06	6.97	03	3.50

Severe constraints (> 40%), Mild constraints (20-40%)&Not a constraint (< 20%)

Source: Field Survey, 2021.

Measures to Promote Effective Use of ICT by Extension Workers

The measures to promote the effective use of ICT by extension workers are presented in Table 7. The results showed that 96.51% of the respondents identified training and re-training of extension workers in ICTs as key for effective adoption of ICT applications. This is because ICT is developing rapidly, and the extension workers are expected to be abreast with the latest developments in the industry so as to optimize their performance. The results also showed that 83.72 percent of the respondents opined that the provision of ICT devices, electricity, and free internet connectivity in the offices of extension staff will enhance the application of ICTs in their extension activities.

While 76.74 percent of the respondents stated that the provision of personal computers, smartphones, and free data bundles will enable them to search, access, and disseminate agricultural information even in the comfort of their rooms. Whereas 62.79 percent of the respondents expressed the need for linking agricultural extension agencies with agricultural research institutes. This will ensure a steady and timely flow of agricultural information from the research institutes to extension workers and then, to the farmers and vice versa. This agreed with the findings of Yekinni & Olaniyi (2007) and Olaolu *et al.* (2018), who opined that increased access to ICT by extension workers enhanced the dissemination of agricultural innovation. Lastly, 61.62 percent of the respondents noted that incorporating social media platforms like Facebook, YouTube, Twitter, etc, in agricultural extension work will improve accessibility and dissemination of agricultural information. This is due to the fact that millions of people access these platforms daily, hence it will be a good medium for exchanging information between extension workers and farmers.

Table 7: Measures to Promote Effective Use of ICT by Extension Workers

Measures	Freq.	%	Ranks
Provision of ICT devices, electricity supply, and free internet connectivity to agricultural extension agencies	72	83.72	2nd
Provision of personal computers, smartphones, and free data bundles to extension workers	66	76.74	3rd
Incorporating social media platforms into agricultural extension work	53	61.62	5th
Training and re-training of extension workers in the internet applications	83	96.51	1st
Linking agricultural extension agencies with agricultural research institutes	54	62.79	4th

Source: Field Survey, 2021.

CONCLUSION AND RECOMMENDATIONS

This study has provided insights into the demographic characteristics of extension workers in BNARDA, their level of knowledge and skills in ICTs, the constraints to the adoption of ICTs in agricultural extension services and proffered solutions on challenges hindering the use of ICT by extension staff. The findings revealed that the majority of extension workers were male, in their active productive years, with a majority

having HND/B.Sc. certificates as their highest qualification with many years of work experience. However, poor maintenance culture, high cost of ICT devices and services, poor electricity supply, and poor telecommunication connectivity were among the constraints to ICT, as well as limited knowledge and skills in ICTs hindered the effective use of internet-based services for accessing and disseminating agricultural extension information.

To address these challenges, it is essential to provide extension workers with ICT devices, free internet connectivity, and training to enhance their knowledge and skills in ICTs. This can be achieved through collaborative efforts between BNARDA management, government agencies, and private organizations. By doing so, BNARDA can harness the potential of ICTs to improve the delivery of agricultural extension services, enhance the productivity of farmers, and contribute to the overall development of the agricultural sector.

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