Proceedings of the Annual Conference of the Agricultural Extension Society of Nigeria
Number: Thirty-First Annual Conference
Theme: Strengthening the Agricultural Extension Innovation Systems for Greater Development Impacts
Date: 12th to 15th April 2026
Venue: Michael Okpara University of Agriculture, Umudike, Abia State, Nigeria
ISSN: 1595 – 1421.
Website: https://info@ajol.org,
Email: agricultural.extension.nigeria@gmail.com; editorinchief@aesonnigeria.org

Training Needs of Agricultural Extension Workers for Cyber Extension in Benue State Agricultural and Rural Development Authority, Nigeria

https://dx.doi.org/10.4314/jae.v31i1.55S

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Abstract

The study assessed the training needs of agricultural extension workers on cyber extension in the Benue State Agricultural and Rural Development Authority, Nigeria. Primary data for the study were collected from the entire 31 extension workers of the organisation using a structured questionnaire. Data collected were analysed using frequencies, percentages and mean scores. The findings revealed that 87% of the extension agents required training for accessing agricultural information online, 83.9% wanted the use of multimedia projectors and digital cameras, 83.9% required training on video conferencing and 74.2 on internet browsing. Online training tools required for cyber extensions were internet browsing 87.1%, electronic email 83.9% and zoom meetings (74.2%). For benefits of cyber extension ($\bar{x}$ 3.85) saves time, ability to reach large crowed ($\bar{x}$ 3.65) and some of the major challenges of cyber extension identified were 100% poor information and communication technology infrastructure, 100% erratic power supply and 96% poor internet connectivity. The advent of cyber extension has assisted in the dissemination of agricultural information to farmers in the presence of dwindling extension agents; hence the training is very essential if extensionists are to discharge their functions properly. Public and private sectors should partner to provide information and communication technology infrastructure

Keywords: Training needs, cyber extension and extension workers

Introduction

Training is a planned programme designed to improve the performance of an individual, group, and or organisation. Improved performance, in turn, implies measurable changes in knowledge, skills, attitudes, and/or social behaviour (Chandra, 2022). It is considered a tool for human resource development. Training has immense potential for the transfer and utilisation of the latest technical know-how, organisation of people, leadership development, mobilisation of people, formation of self-help groups, as well as resources, empowerment of people, and

entrepreneurship development, among others, which are considered essential components of human resource development. Training is a process of learning a sequence of programmed behaviour. It is an application of knowledge that attempts to improve employees' performance in their current jobs and prepares them for the intended result. It may be a short-term process utilising a systematic organised procedure through which non-managerial personnel acquire technical knowledge and skills for a specific purpose. It may be designated to improve the attitude, knowledge, skills and thus, equip an individual to be more effective in his present position or prepare him for assignment in the future. A training need exists when there is a gap between the present performance of an employee designed to improve attitude, knowledge, and skills, and thus equip an individual to be more effective in his present position or prepare him for a future assignment of an employee or group of employees and the desired performance (Price, 2020). Training practices are done to boost performance and develop the skills, expertise and knowledge of the employees in organizations including Benue State Agricultural and Rural Development Authority (BNARDA). Some of the functions of BNARDA are to link farmers to inputs, credit, market and government programmes; to develop an effective agricultural extension system and to achieve this particular function, extension workers were trained regularly, and then they visited farmers on a fixed schedule to teach new practices [Benue State Agricultural and Rural Development Authority (2022)].

Cyber extension is extension of agricultural development with the help of information and communication technologies over cyberspace. Cyber Extension is defined as the "Extension over Cyber Space". In the applied context of agriculture, Cyber Extension means "using the power of online networks, computer communications and digital interactive multimedia to facilitate dissemination of information on agricultural technology/innovations (Wijekoon, 2023). Cyberspace is a space that cannot be seen, created when a communication relationship is established to spread information, in which physical distance is no longer an obstacle (Wijekoon, 2023). The cyber space is an imaginary; virtual space of computers connected on a network around the world. This computer can access information in the form of text, graphics, audio, video and animation files. The software on the network provides the facility to access information interactively from the linked server (Hazelman and Floor, 2024).

Cyber extension is one of the information systems that can be applied as a tool for documentation, management, dissemination, synergize and research on agricultural innovations needed by agricultural development partners so that they can support the harnessing of sustainable agricultural innovations (Amin et al., 2023). Cyber extension-based information technology can provide farmers with a variety of information choices from different sources that can be accessed directly so that they can be used for decision-making to improve their farming systems. Cyber extension has demonstrated a significant potential to ease communication by facilitating the seamless flow of information among the numerous stakeholders in agriculture (African Development Bank, 2022). The usage of cyber extension has brought numerous chances, knowledge and information about different agricultural technologies, challenges and remedies for agriculture growth and knowledge sharing among farmers

Cyber extension work system is one of the pathways for developing an effective agricultural information communication network. Cyber Extension makes use of

digital technologies, including mobile phones, internet, and multimedia tools, to bring agricultural information directly to farmers (Rizkiansyah et al., 2022). Cyber extension represents a system to push forward the mechanism of managing, disseminating, documenting, researching and synergizing agriculture innovations, which are required by agriculture development actors in order to support sustainable innovations development (Amin et al., 2023).

Cyber extension is an agricultural information exchange mechanism over cyber space, the imaginary space behind the interconnected computer networks through telecommunication means. It utilizes the power of networks, interactive multimedia and computer communications to facilitate information sharing (Wijekoon, 2023). This same concept is being promoted under titles like tele-Extension, and e-Agriculture e-Extension by different universities, national and international organizations. The application of cyber extension has reduced a lot of drudgery associated with face-to-face extension work as extension agents are involved in many facets of human endeavours which has made extension work more tasking and also attending to ever-increasing number of farmers. For a decade, many state governments have not recruited extension agents and this has resulted to shortage of extension agents, more area to be covered by fewer extension agents, poor ratio of subject matter specialists to extension agents, a larger number of farmers per extension worker and small number of farmers covered by extension workers in Nigeria (BNARDA, 2022). The advent of cyber extension has come at the right time, and its effective application is an attempt to solve a great deal of the problem of the shortage of extension workers. Nigeria has 219,304,281 active internet subscribers; Benue State has 5,802,125 active phone lines and 4,391,370 active internet subscribers [National Bureau of Statistics (NBS, 2024)]. Agricultural extension, which depends largely on information exchange between and among farmers, on the one hand, and a broad range of other actors, on the other, has been identified as an area in which cyber extension can have a significant impact. There is growing recognition that farmers and members of rural communities have unmet needs for information and appropriate learning methods, a lack that has persisted in Nigeria for a long time (Green, 2023; Lightfoot, 2023). In Nigeria, the national extension services are based on the training and visit (T&V) delivery system, traditionally supported by mobile cinema, video, television, radio and telephone, which are the only ICT used by the majority of extension workers. Extension workers need ongoing training in cyber extension to be competent and perform their functions effectively. Understanding the training needs of extension workers will not only enhance their technical knowledge and productivity but will also equip them to disseminate timely and most relevant information for improved farm production and increased yield.

The broad objective was to assess training needs for cyber extension among extension workers of Benue State Agricultural and Rural Development Authority, Nigeria. Specifically, the study sought to:

i. identify training needs of extension workers for cyber extension;
ii. ascertain online training tools required for cyber extension;
iii. describe benefits of using cyber extension services for information dissemination; and
iv. identify challenges faced in the application of cyber extension

Methodology

The study was conducted in Benue State, North-central, Nigeria which derives its name from the River Benue, the second largest river in Nigeria after the River Niger. The State is made up of several ethnic groups, including Tiv, Idoma, Igede. Others are Jukun, Etulo, Abakpa, Akyeya, Hausa, Igbo and Igala among others. Most people are farmers, while the inhabitants of the riverside areas engage in fishing as their primary or secondary occupation. It shares boundaries with Cross River, to the south, Enugu to the south west, Ebonyi to the south, Kogi to the west, Taraba and Nasarawa States to the east and north respectively. It shares an international boundary with the Republic of Cameroon to the southeast (BNARDA, 2022).

The Benue State Agricultural Development Project (ADP) is known as Benue State Agricultural and Rural Development Authority (BNARDA). The population of the study consisted of all thirty-one (31) extension staff of BNARDA with headquarters at Makurdi. All the 31 extension staff were used for the study. BNARDA has Eastern, Northern and Central agricultural zones. Primary data were collected using a structured questionnaire. The research instrument was thoroughly validated by scholars in the Department of Agricultural Extension and Communication, Joseph Sarwuan Tarka University, Makurdi, Benue State to ensure that it possesses both face and content validity. Data on training needs of extension workers for cyber extension were obtained by asking the respondents to tick from a list of likely training needs. Such training needs included access to agricultural information, use of multimedia projector and digital camera, video conferencing, internet browsing, creation of online groups, knowledge management, collective contribution online, choosing suitable mix of appropriate users online, online self-publication, download and installation of different apps and satisfaction of heterogeneous users online. Data for online training tools required for cyber extension were obtained by providing the respondents with a list of possible online training tools. Such training tools included Internet browsing, electronic mail (e-mail), zoom meetings, news and discussion group, world wide web (www), video conferencing apps, video conferencing and Google meeting.

Data on benefits of using cyber extension services for information dissemination were collected using a 4-point Likert type scale of strongly agree 4, agree 3, disagree 2 and strongly disagree 1. The values were summed to get 10 and divided by 4, and any mean scores of 2.50 and above were considered highly beneficial and those with mean score less than 2.50 were considered less beneficial. Data on challenges faced in application of cyber extension were collected by asking the respondents to tick from a list of possible challenges faced needs. The list of challenges faced included poor ICT infrastructure, erratic power supply, poor network connectivity, limited access to computer and internet, inadequate ICT skills, low level of ICT readiness, fluctuation of service, high cost of soft and hard wares, high cost of data, high cost of cyber extension services, lack of interest and lack of confidence poor ICT infrastructure, erratic power supply, poor network connectivity, limited access to computer and internet, inadequate ICT skills, low level of ICT readiness, fluctuation of service, high cost of soft and hard wares, high cost of data, high cost of cyber extension services, lack of interest and lack of confidence.

Results and Discussion

Training Needs of Extension Workers for Cyber Extension

Results in Table 1 reveal that the majority (87.1%) have access to agricultural information online, use of multimedia projector and digital camera 83.9%, Video conferencing 83.9% and internet browsing 74.2% among others were training required by extension workers for proper use of cyber extension services. The implication is that extension workers have little or no knowledge of accessing information online for its dissemination to formers. The difficulty in accessing agricultural innovations information online for onward dissemination to farmers may affect the adoption of recent innovations as the extension workers may not be able obtain information on recent innovations. The finding is in contrast with Abbasi (2022) that agricultural extension workers needed training in different areas of cyber extension to be effectively with design, production and transmission of messages innovation online easy access all stakeholders in the agricultural value chain. The finding is also, in contrast with Olabanji et al. (2025) who identified breed identification as one of the important training needs required by Fulani women on commercial guinea fowl production in Ogun State, Nigeria.

Table 1: Training needs of extension workers for cyber extension

Cyber training need	Frequency	Percentage
Access to agricultural information online	27	87.1
Use of multimedia projector and digital camera	26	83.9
Video conferencing	26	83.9
Internet browsing	23	74.2
Creation of online groups	23	74.2
Knowledge management	20	64.5
Collective contribution online	20	64.5
Choosing suitable mix of appropriate users online	20	64.5
Online self-publication	19	61.3
Download and installation of different apps	18	58.1
Satisfaction of heterogeneous users online	17	54.8

* Multiple responses *

Online Training Tools Required for Cyber Extension

Table 2 reveal that the highest is internet browsing (87.1%), electronic mail (e-mail) 83.9%, zoom meetings 74.2%, and news and discussion groups 71% among others were some of the online training tools required for cyber extension services. This means if extension workers are trained on browsing the Internet they will be exposed to different online cyber extension tools. Similarly, browsing the Internet may make

them to acquire better skills for online services including the use of electronic mail and World Wide Web and that may lead to identification and use of many online apps like video conferencing and its subsequent applications. Browsing the Internet can be considered the father of all the cyber extension operations that are expected to be used by extension workers if they are to properly function in the current digital information era. Extension workers who do not have the knowledge of browsing the Internet may learn and apply it in their dealings with other stakeholders (researchers, farmers and among other extension workers). The finding is in tandem with that of Rathore and Sumanth (2021) that learning of skills for the use of online services has to begin with browsing the Internet and when the user becomes familiar with its usage, the skills acquired are applied in other areas for online services like downloading and installation of apps and their subsequent applications. The finding confirms that of Arigbo et al. (2023) that the application of online services in agricultural information dissemination generally essential and effective in reaching a large number of audiences in a very short time.

Table 2: Online training tools required for cyber extension

Cyber training tool	Frequency	Percentage
Internet browsing	27	87.1
Electronic mail (e-mail)	26	83.9
Zoom meetings	23	74.2
News and discussion group	22	71.0
World Wide Web (www)	21	67.7
Video conference apps	18	58.1
Video conferencing	17	54.8
Google	16	51.6

* Multiple responses *

Benefits of Using Cyber Extension Services for Information Dissemination

Table 3 shows that most of the attributes, including saves time ($\bar{x}$ = 3.81; SD = 0.83), ability to reach large audience ($\bar{x}$ = 3.65; SD = 0.76), enhance productivity ($\bar{x}$ = 3.55; SD = 0.79), cost-effective ($\bar{x}$ = 3.42; SD = 0.74), reduces travel times ($\bar{x}$ = 3.42; SD = 0.72), immediate feedback ($\bar{x}$ = 3.35; SD = 0.82), require expert knowledge ($\bar{x}$ = 3.29; SD = 0.87), received messages may be stored for future use ($\bar{x}$ = 3.29; SD = 0.78), dependency on technology ($\bar{x}$ = 3.16; SD = 0.61), absence of eye contact ($\bar{x}$ = 3.00; SD = 0.70), absence of body language ($\bar{x}$ = 2.90; SD = 0.85), incompetence and lack of cyber skills ($\bar{x}$ = 2.61; SD = 0.85), lack of equipment/facilities ($\bar{x}$ = 2.55; SD = 0.80), lack of computer skills ($\bar{x}$ = 2. 55; SD = 0.79) and associated with interruptions ($\bar{x}$ = 2.52; SD = 0.77) were benefits using cyber extension for information dissemination.

Dissemination of information on agricultural innovations through cyber extension can save a lot of time for both extension workers and farmers. Information disseminated by extension workers using cyber services can reach many farmers who have cyber extension facilities at the same time at different locations. Using cyber extension

services for information disseminated has no boundaries; farmers anywhere in the world can access such information if they have the facility. Feedback from farmers on certain technologies is also fast. The application of cyber in agricultural extension services has reduced the time wasted in information dissemination. and feedback which are very important components in diffusion of innovations. The availability of timely, accurate, and reliable agricultural information on innovations has the potential to increase yields. In the recent times, information has been known to be part of factors of production because of its importance. With proper information, farmers can be aware of where to obtain agricultural inputs, credit facility and seek advice among others and this when done at the right time leads to improve yield. The finding corroborates that of Wijekoon (2023) that adequate training on e-extension by extension workers is beneficial since it reduces cost of extension services especially among extension workers who are familiar with information and communication technologies.

Table 3: Benefits of using cyber extension services for information dissemination

Benefit	Mean	Standard Deviation
Saves time	3.81*	0.83
Ability to reach large audience	3.65*	0.76
Enhance productivity	3.55*	0.79
Cost effective	3.42*	0.74
Reduces travel times	3.42*	0.72
Immediate feedback	3.35*	0.82
Require expert knowledge	3.29*	0.87
Received messages may be stored for future use	3.29*	0.78
Dependency on technology	3.16*	0.61
Absence of eye contact	3.00*	0.70
Absence of body language	2.90*	0.85
Incompetence and lack of cyber skills	2.61*	0.85
Lack of equipment/facilities	2.55*	0.79
Lack of computer skills	2.55*	0.80
Associated with interruptions	2.52*	0.77
Lack of relevant information	2.03	0.58
Overload of information	2.00	0.63

Cut-off mean = 2.50
* Above cut-off mean

Challenges Faced in Application of Cyber Extension

Results in Table 4 show that poor ICTs infrastructure (100%), erratic power supply (100%), poor network connectivity (96.8%), limited access to computers and the Internet (93.5%), inadequate ICT skills (80.6%) and low level of ICT readiness (80.6%) were some of the major challenges to effective use of cyber extension services. The implication is that poor ICT infrastructure can have negative effects on both extension workers and farmers. For extension workers, it hinders proper dissemination of agricultural information using cyber extension services as more time is wasted in the production of materials and the dissemination to the target audience. Poor ICTs infrastructure can also affect farmers negatively; farmers may not be able to access agricultural information provided by extension workers especially those in the interior areas where there is little or no electricity. However, farmers expected to be direct beneficiaries and improve their yields may not benefit from it. The finding is in tandem with Iwuchukwu et al. (2023) who had a similar finding on the application of social media that many farmers in the rural areas did have access to social media and cannot access farm information. Erratic power supply (100%) has also, made the application of cyber extension a difficult task as the public power supply is not stable and cyber extension activities are dependent on the availability of electricity therefore, this has made the wish of operating an effective cyber extension system in most rural places a nightmare. The finding is in contrast to Akinwade et al. (2023) who analysed the benefits of digital technologies for agricultural investors and identified that the benefit of utilising digital platforms is a sustained market. The finding is similar to Okoronkwo et al. (2026) that erratic power supply was one of the major constraints to application of digital technologies for improve extension service delivery in Imo State, Nigeria.

Table 4: Challenges faced in application of cyber extension

Challenge	Frequency	Percentage
Poor ICT infrastructure	31	100.0
Erratic power supply	31	100.0
Poor network connectivity	30	96.8
Limited access to computer and Internet	29	93.5
Inadequate ICT skills	25	80.6
Low level of ICT readiness	25	80.6
Fluctuation of service	24	77.4
High cost of software and hardwares	24	77.4
High cost of data	24	77.4
High cost of cyber extension services	18	58.1
Lack of interest	18	58.1
Lack of confidence	18	58.1

* Multiple responses *

Conclusion and Recommendations

The study identified that extension workers required training for assessment of agricultural information online, online training tools required for cyber extension were internet browsing; benefits of cyber extension were saving time and one of the major challenges of cyber extension was poor information and communication technology

infrastructure. Information and communication technologies infrastructure should be provided by government and non-governmental organizations, electricity from the public power supply should be improved upon and communication service providers should improve on network connectivity.

References

Abbasi, R., Martinez, P. and Ahmad, R. (2022). The digitization of agricultural industry – a systematic literature review on agriculture 4.0 Smart agricultural technology,

African Development Bank (2022). Empowering women smallholder farmers through digital microinsurance.https://www.adfi.org/sites/default/files/202209/ADFI%20Pula%20Photo%20Essay_final.pdf

Amin, A., Lodhi, R.N. and Mizna, S. (2023).The impact of employees training on the job performance in education sector of Pakistan. *Middle East Journal of Scientific Research,*17(9):1273,1274. idosi.mejsr.

Arigbo, P.O., Agwu, E. A. and Adeogun, T. F (2023). Prominence of agricultural information in print media: A content analysis of selected Nigerian Newspapers. *Journal of Agricultural Extension*, 27(2) 80-87. https://dx.doi.org/10.4314/jae.v27i2.8

Benue State Agricultural and Rural Development Authority (2022). The impact of Benue State Agricultural and Rural Development Authority on Agriculture and Rural Development in Benue State, Nigeria

Chandra, S. (2022). *Alternatives approaches and strategies of human resource development*, Rawat publications. India, Pp 2-3.

Green, R. C. B. (2023). ICTS and rural sector in ACP states; Mirage and marriages? Actress delivered at the CTAs observatory USA.

Hazelman, M. and Floor, A.G. (2024). Regional prospects and initiatives for branding the rural digital divide. AFIT-AWCCA, Joint congress on ICT in agriculture. *Improving Agricultural extension*. A reference manual; Rome, FAO.P.209.

Iwuchukwu, J. C., Eke, O. G, Arigbo, P. O., Chukwudum, E. O. and Igwe, N .J. (2023). Challenges and training needs for integrating social media into agricultural extension services in Enugu State, Nigeria. *Journal of Agricultural Extension, 27*(2) 88-96*.* https://dx.doi. org/ 10.4314/jae.v27i2.9

Lightfoot, C. (2023). Demand-driven extension; some challenges for policy makers or managers. ICTs-transformingagriculturalextension? The 6 consultative experts meeting of CTAs observatory on ITCs, Wageningen, 23-25 September, 2023.

National Bureau of Statistics (2024). Telecoms data: Active voice and internet, porting and tariff Information

Olabanji, O.P., Ogunlade, I., Olabanji, F.A. and Yakubu, E. A. (2025). Training needs of Fulani women on commercial guinea fowl production in Osun State, Nigeria. *Journal of Agricultural Extension 28*(2), 91-100

Okoronkwo, I. E., Ugwuegbulam, R. T., Uwandu, C. N., Odoemenam, E. F., and Adegbile, A. A. (2026). Agricultural extension agents' proclivity to use digital technologies for improved extension services in Imo State, *Nigeria. Journal of Agricultural Extension*, *30*(3) 94-106

Price, N. (2020). Personnel human resource management. In Brech EFL (Ed). *Principles and Practice of Management London.* Longman Group Ltd.

Rizkiansyah, M., Ariestyani, A. and Yunus, U. (2022). The comparison between cyber extension and traditional interaction in the farmers environment during pandemic. *Earth and Environmental Science*, *951*(1).

Wijekoon, R.R.A. (2023). Concept paper presented to Sri Lanka council for agricultural research policy.