

How to Cite This Article: Abdulwahab, A., Lateef, L. A., Obafemi, B. O., Ayanda, V. O., Adeniyi, K. I., & Raza, H. A. (2023). Traditional and Modern Approaches in Agricultural Extension Practice in Nigeria. *Journal of Social Sciences Review*, 3(1), 552–561. <https://doi.org/10.54183/jssr.v3i1.196>



Traditional and Modern Approaches in Agricultural Extension Practice in Nigeria

Aderinoye–Abdulwahab, S. A.	Department of Agricultural Extension and Rural Development, University of Ilorin, Nigeria.
Lateef Lawal Adefalu	Department of Agricultural Extension and Rural Development, University of Ilorin, Nigeria.
Obafemi, B. O	Department of Agricultural Extension and Rural Development, University of Ilorin, Nigeria.
Ayanda, V. O	Department of Agricultural Extension and Rural Development, University of Ilorin, Nigeria.
Kaothar Idris–Adeniyi	Department of Agricultural Extension and Rural Development, Osun State University, Nigeria.
Hafiz Ali Raza	Institute of Agricultural Extension, Education and Rural Development, University of Agriculture, Faisalabad, Punjab, Pakistan.

Vol. 3, No. 1 (Winter 2023)

Pages: 552 – 561

ISSN (Print): 2789–441X

ISSN (Online): 2789–4428

Key Words

Extension Approaches, Sustainable Livelihoods, Rural Development, Participatory Extension

Corresponding Author:

Aderinoye–Abdulwahab, S. A.

Email: saderinoyeabdulwahab@gmail.com

Abstract: Access to appropriate and timely agricultural extension services has remained an enduring input in the alleviation of rural poverty. A pluralistic approach to agricultural extension services by government, farmer-based organization, non-governmental organizations (NGOs) and active participants in agricultural value chain will help facilitate the needed advisory services in order to achieve improvement in livelihoods and reduce vulnerability. The exponential growth rate resulting in population explosion, fast rising vagaries in technology use, heightened increase in livelihood vulnerabilities and the impact of climate change; have further mandated the need for a holistic and urgent review of the approach to extension service delivery. The training and visit system, on-farm visits, village meetings, pilot projects, farmer's field school, and model villages are among the long-standing public extension approaches. These approaches are largely being taken over by private extension organizations who have adopted the more satisfactory participatory, bottom-up decentralized and ICT compliant approaches. In view of the foregoing, there is now an urgent need to appraise both the existing traditional and emerging modern approaches. This article therefore reviewed and compared the two approaches with the possibility of having a blend of the two; so as to attain a reduction in vulnerabilities and an improvement in livelihoods and national development. Therefore, the study recommends a combination of both the traditional and modern approaches in a decentralized fashion, rather than the conventional linear (top-down) approach.

Introduction

Agriculture is a major derivative sector of any economy; the impact of which can adequately

contribute to national development. The feeding of the growing population of the world and Nigeria specifically; requires prompt attention to

agriculture for satisfactory results (Ufiobor, 2017). Agriculture constitutes one of the most intractable aspects of economic development. It is not only a dominant and dynamic force for economic growth and food security requirements of the populace, also through it, the economic and industrial sector of a country can increase vehemently as raw materials can be obtained for key agro-based industries such as textiles, sugar and food processing units (Ibrahim et al., 2017). Nigeria agricultural sector is regarded as the engine of Nigeria's economy, which contributes positively to alleviate rural poverty (Abiwon, 2017). It is a vehicle for reinforcing and fostering diverse economic development, foreign exchange earnings, sustainable food security, employment generation, social stability, land preservation, development of rural areas and has had a lasting impact over the past four decades (Kane, 2020). Notwithstanding the significance of agriculture, the sector still depicts unstable prices and poor marketing system, as well as problem of pests and diseases, inadequate tools and machinery along with other myriad of problems such as rural-urban migration, inadequate infrastructure, climate change, inadequate access to credit facilities, inadequate storage and processing facilities, farmers-herdsmen conflicts, and inconsistent government policies on agriculture (Udemezue & Kanu, 2019). Agricultural activities are carried out mostly in the rural areas, where most residents are illiterate and distant from access to relevant information needed. Extension services have proved to be effective in ensuring that information and innovations required for agricultural development get to the targeted audience at the right time and in the right manner.

The importance of agricultural extension can be visibly seen as it makes available the medium through which the challenges of farmers can be directed and addressed by pointing out research and adaptive approaches that are of advantage to the rural communities or clientele (Agunga, 2017). The roles or objectives of agricultural

extension are to: increase agricultural production, teach improved farming practices, collect and collate of basic information, serve as intermediary between farmers and research institutes, supervise agricultural development programmes, acquire skills and identification of proper marketing channels (Iwena, 2018).

Extension and advisory services is therefore of great necessity and plays an important role in agricultural development. These indispensable responsibilities put the extension agents at the forefront of combating some of the challenges faced by the farmers. Agricultural extension facilitates the dissemination of innovation, improved technology and practices through a range of traditional approaches such as the age-long extension teaching methods (individual, group and mass methods) that had been in use for quite a long time. More recently, different modern approaches such as participatory extension, pluralistic extension, and private extension approaches have also evolved and have been tested and deployed (Kidane & Worth, 2017; Mapiye et al., 2021). Such approaches help to increase the possibility of adoption of technologies and/or practices by farmers. Agricultural extension remains an instrumental plan for rural development across the world as it helps farmers to ascertain their challenges and assist them to seek advantageous solutions while motivating them to take action. Given that information is a necessity for change, the existence of agricultural extension is, therefore, to enable a positive change in the farmers or target audience through the information provided by them and these include: knowledge and skill needed by the clientele.

Extension approaches are different ways of communicating between the farmers and the extension agents while the goal of extension service is to increase farmer's productivity through well prepared approaches (Amungwa, 2018). There are various examples of extension approaches which were categorized based on the type of audience but those approaches also differ

in administration. Examples of such techniques include: farm visits and office calls (Individual), farmers' field school and training days (Group), videos and bulletins (mass media) (Iwena, 2018). Majority of these techniques have been in operation through the public extension approach with its management standing on or supported by the central government, spare-headed by the state subjects. However, this approach has not been effective and lacks mutual flow of information between the change agent and the clientele (FAO, 2017). Thus, this article will present the diffusion and innovation the traditional extension approaches, modernized extension approaches, the challenges limiting the adoption of a diversified extension approach while offering suggested measures to solve the identified problems.

Diffusion and Adoption of Innovation

Agricultural research institutes or organizations usually bring innovations to the farmers through extension agents. The diffusion and adoption of innovations or ideas and techniques in agriculture is not always automatic. The rate of adoption of a particular innovation varies with individuals depending on several factors to include: level of education, attitude of the farmer, financial status of farmer, size of the farm, presence of extension worker and result demonstration among others (Issa, 2016; Jenkins et al., 2018). According to Iwena (2018), Diffusion of Innovation (DoI) theory was developed by Rogers in 1962. It is defined as a mental and individual resolve to utilize an innovation or technology as the most favorable intended action obtainable. The adoption of a practice is not instant but an intellectual process which an individual passes through from the point of first hearing about an innovation up to the final stage of deciding whether or not to use it. Several phases of reasoning and resolution are involved in a clientele's decision to accept or refuse adoption of a production technology (Fawole and Aderinoye-Abdulwahab, 2021) and it is for this reason that both farmers and extension

practitioners would have to follow through the stages of adoption and diffusion before they can decide whether to accept an innovation or technology. The decision to adopt will therefore be impacted upon by the methods being used to push the technologies. The stages of adoption include: Awareness, Interest, Evaluation, Trial and Adoption.

Traditional and Modern Extension Approaches

Extension service is aimed at ensuring sustainable agricultural development, keeping the ecological balance in the natural environment, and making sound agricultural decisions with the assistance of valuable information communicated by extension personnel (Yekinni & Christina, 2019). Extension is the process of getting farmers to do what they would otherwise not have regard for; hence the need for proper choice of approaches and delivery methods in order to attain the extension's objective. The three extension methods housed within the traditional approach are individual, group and mass media. These methods are used for communication between extension agents and their clientele and it is the ability of the extension agent that will determine how effective these methods can be. The end-users also have a role to play as various challenges are being encountered in the delivery of extension services.

Some of the challenges that may arise include low literacy level leading to difficulty in understanding the technologies while some end-users could be merely resistant to change. Evidence from literature shows that most extension approaches before the year 2000 were characterized by the top-down approach where extension agents were being given directives to be subsequently taken by the farmers (Mumtaz & Gopal, 2019). An example is the Training and Visit (T&V) approach to extension, this approach was deficient and unproductive. This led to the introduction of approaches perceived to be more participatory (Ogebe & Adanu, 2018). In the top-

down approach, the extensionists are usually overwhelmed and saddled with all the brainy activities while farmers' brains remain dormant; whereas in participatory extension approach (PEA), all brains (extensionists and farmers) work together.

Participatory extension is like a school where you try out ideas and share experiences with others. It usually involves transformation in the way extension agents interact with farmers. In participatory extension, community-based extension and joint learning is central (FAO, 2020). Participatory extension approaches are ways of improving the effectiveness of rural extension efforts by government agencies, NGOs and other organizations that engaged in rural development (Kamalpreet & Prabhjot, 2018). An example of the participatory extension approach is the Participatory Technology Development (PTD), this approach involves farmers conducting the procedure for developing technology (FAO, 2019). The aim of this method is to examine the technological concept of farmers, which is being carried out under an indigenous state of technologies that has been successful in other regions with good outcomes.

Other methods of PEA in use are: farmer-to-farmer (F-to-F) and farmer field schools (FFS) but these methodologies might only address a few number of farmers problems and can even be used in top-down manner. It should however be observed that these approaches can be more effective in community-based PEA framework as many more farmers will be involved (FAO, 2019). Participatory technology differs from the demonstration methods as it develops the capability of the farmers to respond adequately to their problems by experimenting alongside with ideas. A striking difference between demonstration and participatory approach is that PEA is done in an inclusive manner with farmers being partners and also without proven or recommended technology. In other words, PEA is experimental and comes with some uncertainties, even with the predictions.

However, PTD remains a learning process as knowledge would have been passed regardless of whether the outcome is positive or negative (Olarinde et al., 2017; Innocent & Ranganathan, 2019).

In recent times, extension has evolved; and there is now a clear distinction of approaches used for extension services. Broadly speaking, extension is being categorized into two: the traditional approaches which some refer to as old style and the modernized, referred to as contemporary approaches. While extension practitioners view approaches such as the training and visit (T & V), farmer field schools, and commodity approach extension as old and conventional; emerging extension practitioners believe that extension should adopt a combination of more participatory and contemporary methods such as the use of innovation and technology driven approaches. This article, therefore, postulates that the fusion of both the traditional and modern approaches would result in an improved extension outreach as well as holistic national development.

Challenges to Agricultural Extension Practice in Nigeria

In developing countries, extension is specifically saddled with the responsibility of encouraging the need for new methodologies to promote the incorporation of new ideas into solid benefits for poor farmers, to disseminate agricultural-based technology to enhance the efficiency and well-being of farmers and also the nutritional conditions of their household (Kidane & Worth, 2017). Regardless of this, transforming agricultural extension services is faced with a myriad of problems which includes the rate at which research were being conveyed to farmers (Izuogu et al., 2020). Poor organizational, administrative and institutional structures, inadequacy of clientele's involvement in the planning process are some of the issues affecting extension service and its delivery. The need for extension to improve on the transfer of

information and knowledge between farmers, community groups, and research institutes is of paramount importance; so is the approach and device for improving local access to knowledge of high quality which are the requirements for elevating livelihood and reducing vulnerability (Omeh et al., 2018).

Irrespective of how good technologies are for end-users, they cannot be adopted automatically. Good extension work does not mean telling farmers what to do, forcing change on farmers, that you know more than farmers, that modern approaches are always better than traditional, but good extension work means talking with farmers, working with farmers, learning from farmers, and suggesting new approaches to farmers (Mumtaz & Gopal, 2019). Therefore, to effectively serve farming communities and other end-users, research institutes require extension services that are acquainted with the practical problems faced by end-users and in turn extension services need the strong support of agricultural research institutes. It can thus be deduced that a more pluralistic approach to agricultural extension delivery is necessary for productive synchronization among agencies along the agricultural value chain. Since the 1970, a good number of models have been executed, integrating approaches to outreach services and adult education, which includes the world Bank's Training and visit (T & V) model, participatory approaches and the more recent farmer field school (FAO, 2020). Extension should evolve with regards to the empowerment of end-users through community or farmer groups of those with common interest. The focal area approach (FEA) as a participatory process which focuses on poverty reduction, empowerment of small-scale farmers, and research-farmer-extension-linkages. These approaches therefore go beyond relating information on agricultural-based technologies available but also to mobilize rural communities to realize their potential in developing themselves and the areas where they need development.

Other existing participatory approaches and technologies that have been improved upon include: Participatory Rural Appraisal (PRA), Rapid Rural Appraisal (RRA), and Participatory Action Research (PAR). All of these involve the gathering of information on developments in local communities and other community groups through several collections of approaches and methods, usually done through community meetings, village committee meeting and community workshops (Kidane & Worth, 2017). It involves interviewing key informants, reviewing secondary data and conducting semi-structured interview with groups and individual. The use of Information and Communication Technology should not replace the need for physical presence of extension agents even while it is being harnessed so as not to neglect distinctive factors like ecological conditions and indigenous mode of communication (Yekinni & Christiana, 2019). In essence, an effective pluralistic approach to agricultural extension delivery is necessary for productive synchronization among agencies along the value chain. This is when extension is decentralized to capture government, private and non-governmental extension organizations as well as using a range of approaches. It is unlike the traditional extension approach which involved only the public extension activities. For example, ADPs were the only organ of extension in the early 1980s in Nigeria but we now have several NGOs and private extension agencies.

Commercialization of extension is also a pluralistic approach in extension service which involves the introduction of up-to-date outcome by means of changing an enterprise into a profit-oriented activity whereby goods and services obtain a monetary value. This may also involve coming together of government, farmers and the private extension organizations, each of whom contributes to the extension services given in terms of cost or inputs. However, government and the farmers receiving the extension services will usually contribute more in terms of the cost. In extension service and delivery, various approaches that have been proven to be effective

should be commercialized. Kaur and Kaur (2018) identified some of these approaches which can actively increase the knowledge and also improve the standard of living of its users. The farmers' interest approach, the cost-sharing approach, the market-led approach, project-based approach, mass-media and the participatory approach are some of the available approaches which extension can maximize through commercialization.

An Argument for a Diversified Use of Extension Approaches in Agricultural Extension Practices

It has been stressed that agriculture is a core sector of the economy and this has made it to be highly necessary to strengthen its success. Agricultural extension, being a channel of transfer of ideas, technologies and innovations with clientele of varied socio-cultural and economic background as well as varied level of skills; requires more sophistication in terms of delivery methods. A diversified use of extension approaches and methods is therefore required to handle the range of options integral to extension services (Almashhadane et al., 2017). The effectiveness of extension methods leads to an effective extension system resulting in rural development. A variety of extension approaches and methods therefore enable the empowerment of farmers; and as a result, improve their livelihoods (Ramjattan et al., 2017).

The adoption of innovation largely depends on assimilation of information and knowledge by the target audience through selected extension approaches. An understanding of the stage of adoption of a farmer or clientele helps in determining the extension approach and methods to be used. Adopting varied extension methods in disseminating an innovation helps to capture the attention of end users at various times and different levels. Findings from Maoba (2016) also revealed the perception of farmers on the effectiveness of extension methods, two out of ten extension methods were said to be effective

for farmers in the study area which were training and demonstration.

There are various factors both inherent (knowledge, perception, attitude) and external factors (size of farm, age, religion, income) influencing the adoption of technologies by farmers or end users. It is important to build up firm and desirable agricultural extension methodologies that are required to enhance the adoption of technologies. It is equally necessary to educate and equip farmers through appropriate methodologies that will lead to the acceptance and implementation of the technologies received. The degree of farmer's response to extension services depends on the quality of what is being offered, the content, cost, time and how often the methodology is exposed to the end users (Mumtaz & Gopal, 2019). For the effectiveness and sustainability of technology conveyed through extension and also to encourage active participation of clientele, extension personnel are to take cognizance of the need of the clientele before embarking on any adoption of innovation. Furthermore, the fusion of the two distinct approaches (traditional and modern) of extension which complements each other produces better result than only one.

Mitigating Measures to Strengthen the Adoption of a Fused Extension Approach

There have been disagreements over the building of capacities for new extension strategies by the public sector organizations in various countries. Regardless, to effectively serve end-users and the farming communities, researchers and other stakeholders need the extension services and vice versa. In the use of a fused extension approach for innovation dissemination, various barriers are confronted by users and extension agents, to mitigate these limitations; the following sustainability measures are mentioned:

1. The need for reinforcement is critical: for adoption of a fused approach to be sustained, farmers' decision should be strengthened occasionally through follow-

ups as this is adequately required for the continuous usage of innovations adopted.

2. Extension agents who are the channels through which innovations reach the end-users, sometimes are faced with the challenge of inadequate or lack of technical knowledge about recommended farm practices and delay in receiving production inputs as well as high cost of inputs. These barriers hinder the adoption of modern extension approaches and thus require capacity building and adequate funding to effectively carry out their roles.
3. A pluralistic approach, which will include farmer to farmer extension with a large number of actors from the private and also the public sectors taking part in various positions, should be adopted in order to improve upon the current traditional approach which is limiting in its effectiveness.
4. Utilization of the decentralized mode of operation whereby development is of great priority at all levels from the village to the cell, sector, district, province and national level, taking note of the entry point for a sustainable extension system.
5. A combination of approaches and use of variety of methods such as the training of trainers (TOT) where farmers train other farmers, Training and Visit which has not been sustained due to insufficient funds, farmer field schools, participatory extension, demonstration, use of mass media, among others should be reintroduced.
6. The setting up of sensitization and awareness strategies for farmers and end-users to adequately access opportunities become expedient. This will ensure sustainability of the fused approach.

Conclusion and Recommendations

It can be deduced that extension approaches and methods are of great importance in facilitating agriculture in particular; and development

holistically. It should be noted that the combined utilization of varied extension approaches, whether the age-long traditional or the modern approaches, would result in better outputs in dissemination of innovation. The fusion of two distinct approaches, which can be the traditional top-down approach and the modern pluralistic and participatory approaches, will produce a better result. The important thing is to consolidate on all approaches individually or collectively as there is no 'most' appropriate approach that can give the best expected result due to different needs of the farmers that are affected by their geographical location and socio-economic characteristics. Additionally, a major principle of extension is the use of varieties of teaching methods; hence, effective extension service delivery will be easily achieved with a virile agricultural extension service that liaises with the appropriate agencies and adopt appropriate information dissemination strategies that caters for the needs of farmers and other end users.

Therefore, this article recommends that relevant institutions in extension need to revamp the agricultural extension policy and effectively implement it according to farmers' needs and field problems encountered. Further, extension services, through their agents, should continuously take note of the gaps in application of agricultural extension approaches and find out how the gaps can be filled. Extension service is majorly the responsibility of the Ministry of Agriculture and Rural Development in most developing countries. Privatization should be encouraged for effective acquisition of needs from extension services as government, alone, may not be able to shoulder the overwhelming requirements of extension service provision. It is also paramount for government to decentralize the current extension mode of operation for development at all levels while setting up awareness strategies among farmers and end-users in order for them to be able to access and utilize supports from various agricultural

partners to ensure sustainability and national development.

References

- Abiwon, B. O. (2017). The prospects of agriculture in Nigeria: How our fathers lost their way- a review. *Asian Journal of Economics, Business and Accounting*, 4(2), 1-30. <https://doi.org/10.9734/ajeba/2017/35973>
- Agunga, R. (2017). The role of Agricultural Extension in Africa's Development: the importance of extension workers and the need for change. *International Journal of Agricultural Extension*. 05(01).59-70
- Almashhadane, A., Magd, Z., & Keshta, A. (2017). Levels of use and importance of extension methods and aids in the process of dissemination of agricultural technologies in the Republic of Iraq. *IOSR Journal of Agriculture and Veterinary Science*, 10(5), 1-6. <https://doi.org/10.9790/2380-1005020106>
- Amungwa, F. A. (2018). Appraisal of innovations in agricultural extension and advisory services in Cameroon. *Journal of Advancement in Plant Science*, 1(2), 1-9.
- FAO, (2017). A report to the G20 Agricultural Deputies. *Information and Communication Technology (ICT) in Agriculture*. Food and Agriculture Organization; Rome, Italy.
- FAO, (2019). Agricultural Extension Manual, by Khalid, S.M.N. & Sherzad, S. (eds). <https://ssrn.com/abstract=3401748>
- FAO. (2020). Monitoring, evaluation and learning in farmer field school programme: A framework and toolkit. Rome: Food and Agriculture Organization. <http://www.unjobnet.org/jobs.detail/1816023>
- Fawole B. E. and Aderinoye-Abdulwahab, S. A. (2021). Farmers' Adoption of Climate Smart Practices for Increased Productivity in Nigeria. In: Leal Filho W., Oguge N., Ayal D., Adeleke L., da Silva I. (eds) African Handbook of Climate Change Adaptation. Springer, Cham. https://doi.org/10.1007/978-3-030-45106-6_227
- Ibrahim, S., Waziri, S., Mohamed, N. N., Mukhtar, U., & Muhtar, B. (2017). Export of agricultural raw materials, exchange rate and economic growth in Nigeria: An ARDL approach to co-integration. *Journal of Economics and Sustainable Development*, 8(22), 76-86.
- Innocent, M. & Ranganathan, R. (2019). Management framework of ongoing self-sustaining agricultural extension system and training of farmer promoters and farmers in Rwanda. *Rwanda Journal of Agricultural Sciences*, 1(1), 52-60.
- Issa, F. O. (2016). Farmers' perceptual analysis of the quality and accessibility of agrochemicals in Kaduna and Ondo States of Nigeria: Implications for policy. *Journal of Agricultural Extension*, 20 (1): 81-95. Available at: <http://dx.doi.org/104314/jae.v201.7>.
- Iwena, O. A. (2018). *Essential Agricultural Science for Senior Secondary Schools*, pp 331-339.
- Izuogu, C. U., Onyeneke, R. U., Njoku, L. C., Azuamairo, G. C., Atasie, M. C., & Onuabuchi, M. J. (2020). Review of opportunities and challenges of agricultural extension and advisory services among rural farm households in Nigeria during pandemics. *Asian Journal of Agricultural and Horticultural Research*, 1-12. <https://doi.org/10.9734/ajahr/2020/v6i330072>
- Jenkins, M., Shanks, C. B., Brouwer, R., & Houghtaling, B. (2018). Factors affecting

- farmers' willingness and ability to adopt and retain vitamin A-rich varieties of orange-fleshed sweet potato in Mozambique. *Food Security*, 10(6), 1501–1519. <https://doi.org/10.1007/s12571-018-0845-9>
- Kamalpreet, K. & Prabhjot, K. (2018). Agricultural extension approaches to enhance the knowledge of farmers. *International Journal of Current Microbiology and Applied Science*, 7(2): 2367–2376. <https://doi.org/10.20546/ijcmas.2018.702.289>
- Kane, D. (2020). Why agriculture is important and its roles in everyday life. <http://agriculturegoods.com/why-is-agriculture-important/>
- Kidane, T. T., & Worth, S. H. (2016). Different agricultural extension systems implemented in Africa: A review. *Journal of Human Ecology*, 55(3), 183–195. <https://doi.org/10.1080/09709274.2016.11907022>
- Maoba, S. (2016). Farmers' perception of agricultural extension service delivery in Germiston region, Gauteng province, South Africa. *South African Journal of Agricultural Extension* (SAJAE), 44(2). <https://doi.org/10.17159/2413-3221/2016/v44n2a415>
- Mapiye, O., Makombe, G., Molotsi, A., Dzama, K., & Mapiye, C. (2021). Agricultural extension systems for the sustainability of smallholder livestock production in developing countries: The potential of ICT. *Journal of Sustainability*, 13, 58–68. <https://doi.org/10.3390/su13115868>
- Mumtaz A. B & Gopal, B. T. (2019). Review of the agricultural extension modes and services with a focus to Balochistan, Pakistan. *Journal of Agricultural Science*, 18(1), 188–194. <https://doi.org/10.1016/j.jssas.2017.05.001>
- Ogebe, F. O. & Adan, D. O. (2018). Impact of training and visit (T&V) extension system on outputs and income of ceareal farmers in Zangon Kataf Local Government Area of Kaduna State, Nigeria. *Journal of Research in Business and Management*, 6(6)42–49.
- Olarinde, L., Binam, J., Fatunbi, A., Diagne, A., Adekunle, A., & Ayanwale, A. (2017). Participatory research demonstration and its impact on the adoption of improved agricultural technologies in the savannas of West Africa. *African Crop Science Journal*, 25(1), 21. <https://doi.org/10.4314/acsj.v25i1.3s>
- Omeh, O.J., Aghale, D. N., & Anyim, A. (2018). Assessment of influence of extension teaching methods on the level of adoption of agricultural innovation in akwa-ibom state, Nigeria. (2018). *International Journal of Advanced Research in Botany*, 4(1). <https://doi.org/10.20431/2455-4316.0401001>
- Ramjattan, J., Wayne., Ganpat., & Chowdhury, A. (2017). Value of modern extension methods in improving image and quality of extension: perception of extension agents in Trinidad and Tobago. *Journal of Agricultural Extension and Rural Development*, 9(10), 155–162. <https://doi.org/10.5897/jaerd2017.0882>
- Udemezue, J. C. & Kanu, N. A. (2019). Challenges of Nigeria agricultural sector in the twenty first century: The case of nomadic insurgence and terrorist sects. *Universal Journal of Agricultural Research*, 7(2), 117–124. <https://doi.org/10.13189/ujar.2019.070204>

Ufiobor, K. A. (2017). Nigeria, agriculture and sustainability: problems and solutions. (Bachelor's Thesis, University of Applied Sciences, Yrkeshogsolan, Nova)

Yekinni, T. O. & Christiana, A. (2019). Farmers' assessment of the effectiveness of

extension communication methods used in Ogbomosho Agricultural Zone of Oyo-State, Nigeria. *Journal of Agricultural Extension*, 23(3), 126.