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E-extension as a Tool for Sustainable Agricultural Extension Service Delivery in Nigeria: A Review <https://dx.doi.org/10.4314/jae.v27i1.9S>

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Abstract

Extension service delivery is undergoing a rapid change the world over. This change is partly informed by the emerging trend of technological advances and partly attributed to the level of literacy among the clientele of extension, largely the farmers. This is evident in the rapid proliferation of digital infrastructure in recent times. Digital transformation has led to the easy reach of e-based technologies to farmers. One of the usefulness of e-extension is the speed with which it delivers information to its audience. The e-extension is also a safe way of delivering extension services to farmers, especially in the face of insecurity and pandemics. The concept of e-extension connotes using online networks, computer communications and digital interactive multi-media to facilitate the dissemination of agricultural technology. In challenged societies such as Nigerian communities of today, the e-extension is the best option to ensure a continued supply of extension information to farmers, given that physical contact between extension workers and farmers is increasingly becoming difficult. This study reviewed the various e-extension approaches, their application, their usefulness and challenges in providing extension services to farmers, especially in developing countries.

Keywords: E-extension, Extension service delivery, Technological advances, Nigeria

Introduction

Agricultural extension is indispensable to agricultural development. Agricultural extension plays a strategic role in bringing various stakeholders in agricultural development together. Specifically, it links together scientists and researchers working on different aspects of agriculture and the farmers on the field who implements the various research findings to improve the production and processing of agricultural produce. Furthermore, it helps to improve the livelihood of farmers and contributes to the development of rural communities (Alabi, 2021)

Extension services are organized and delivered in a variety of forms, with the ultimate aim of increasing farmers' productivity and income. The question is how can farmers gain access to knowledge and information on improved practices along the value chain to adopt, and increase yield and income. The success of extension in achieving this will however depend on the extension approach that is being used to reach or communicate with farmers. The use of innovative approaches and strategies to increase coverage is therefore a concern for all involved in agricultural extension and advisory services. In Nigeria, a range of approaches to extension delivery (training and visit, ministry of agriculture operated extension, university-operated extension approach, to a more participatory approach) have been promoted over the years by the various extension

service providers, including government and non-governmental organizations. The failure of many of these extension approaches to meet their goals effectively, coupled with inadequate personnel and limited budgets for supporting public extension, has led to continuous modification and experimentation with existing approaches, (Anupam and Maruthamuthu, 2018).

In order to complement the traditional approaches, stakeholders and actors in the agricultural extension service delivery system deem it necessary to avail by web based approach (e-based services) that will reduce the gap between farmers and extension personnel and increase the speed with which information is delivered to the target farmers (Anupam and Maruthamuthu, 2018). According to Efejika et al., (2019). E-extension is the use of internet technology or information communication technology as a platform for exchanging information and providing services to actors in the agricultural value chain. E-extension tools support the delivery of information in diverse styles such as voice, image, motion, instant messages, and applications.

Nigeria, with over 87 million people engaged in agricultural livelihood needs a robust e-extension delivery service. This is more so because the ratio of extension agents to farmers keeps going high. Sennuga (2020) puts the ratio of public extension agents to farmers in Nigeria at 1:3000, which is contrary to the World Bank recommendation of 1:500, (Sennuga and Fadijii, 2020). This large disproportionate ratio makes it imperative for agricultural agencies in Nigeria to explore more effective approaches of reaching their clients in the shortest possible time. One such approach is the use of e-extension. This paper reviewed the following e-extension approaches: The national farmers' helpline center; The growth enhancement scheme (GESS)/the e-wallet system and the Digital Green (DG) approach in India, Tanzania, Ethiopia, Mozambique and Ghana.

Concept of E-extension

Extension stands for "the action or process of enlarging or extending something" it could be an extension of area, time or space. E-extension (Cyber extension) thus can be defined as "the extension over cyberspace". In the applied context of agriculture, cyber extension means "computer communication and digital interactive multi-media to facilitate the dissemination of agricultural technology".

E extension could also be termed as a network of institutions that provide a more efficient alternative to the traditional extension system of agriculture. It is a collaboratively built internet-based environment to enhance face to face and paper-based transactions, which can also be used as an electronic tool delivering sound and the latest information on agriculture, (Renwick,2019).

Approaches to e-Extension Delivery

An approach is a doctrine for the system, which informs, stimulates and guides such aspects of the system as its structure, leadership, program, resources and linkages. It can be a methodology; tactics and style of passing improved agricultural information to farmers. An approach is a way in which different guiding principles are applied in a specific situation to fulfil different purposes. It consists of a series of procedures for planning, organizing and managing the extension institution as well as for implementing practical extension work by staff with technical and methodological qualifications and using the necessary and appropriately adapted means (NAERLS, Extension Bulletin,2020). The approaches reviewed are the national farmers' helpline, the growth enhancement support scheme and the digital green approach.

National farmers help line (NFHL), approach in extension service delivery

The National Farmers Help line (NFHL) is an e-extension approach established in 2014 by the National Agricultural Extension Research and Liaison Services (NAERLS) Nigeria, to increase productivity for sustainable agricultural development in the country across the six geo-political zones in order to have a greater penetration to cover a wide area and the target beneficiary in every aspect of agriculture (NAERLS, Extension Bulletin, 2020). The NFHL facilitate efficient and effective agricultural extension services to farmers through the dissemination of good agronomic practice electronically, using the latest ICT and also serve as a medium for dissemination and delivery of improved technologies, market linkages and other agricultural information and advisory services to farmers to compliment traditional extension agents/farmers interface in Nigeria (Bashir, et al., 2020).

Usefulness of the National farmer's helpline center

Achieving sustainable agricultural development is not only based on material inputs (such as seeds and fertilizer) but on the institutions and people involved. Availability of adequate information on production techniques and the application of technologies are indispensable to improving farmers' production and productivity. This is because information and technology are important inputs for agricultural development which is readily available in the National Farmers Helpline Centre.

Bashir et al. (2020), carried out a study titled "The Role of National Farmers Helps Line in Agricultural Information Dissemination among Crop Farmers in Nigeria: A Case Study of NFHL, NAERLS ABU Zaria" The findings reveal that the NFHL supplies farmers around with all the necessary information regarding agricultural production ranging from information on cultural practices, access to fertilizer and application, pest and disease management practices, weed management practices, marketing strategies, post-harvest activities, management of farm tools and machineries and also information on government policies on agriculture. Accordingly, the NFHL uses all the major Nigerian languages (English, Yoruba, Hausa, Igbo and Nigerian Pidgin) spoken by the call agents, which has enable farmers from all parts of the country to enjoy their services. In the same vein Bashir et al., (2021) conducted a study on "Rural Farmers' Readiness to Access Information from the NFHL, NAERLS ABU Zaria, Kaduna State, Nigeria" and found that farmers were ready personally, mentally, materially and with required infrastructure to access information from the National Farmers Helpline Centre, Ahmadu Bello University, Zaria.

There is also verse agricultural information and skills available at the NFHL Centre, NAERLS ABU Zaria, therefore, both rural and urban farmers should be committed by dialing the NFHL to access the readily available agricultural information for a productive and sustainable agriculture in the country. The study further revealed that large number of farmers can call at the same time and be attended to. These findings are in line with the results of (Ifejika et al., 2019), that e-extension platforms have the ability to connect large number of farmers with subject matter specialists at the fastest possible time.

Challenges in the farmer's helpline center

Challenges with the NFHL center include high cost of maintenance, large number of farmers calling at the same time, facility update, funding and time. (Bashir et al.,2001), (NAERLS Extension Bulletin, 2020).

The growth enhancement support scheme (GESS) and the e-wallet system approach

The Federal Government of Nigeria introduced the Growth Enhancement Support Scheme (GESS), in July 2012. The GESS is designed to deliver government subsidized farm inputs directly to farmers by informing them via GSM phones. The GESS is powered by E-wallet, which provides an efficient and transparent system for the distribution and purchase of agricultural inputs based on a voucher system. The scheme guarantees registered farmers of E-wallet access to fertilizer, seeds and other agricultural inputs from agro dealers at half the cost. The Federal and State Governments take care of the other half. With worldwide access, e-wallets are an excellent tool to facilitate online payments. (Agbareyo and Ukagha, 2018), (Olagunju,2021).

The E-wallet system was introduced in Nigeria in 2012 by the then Minister of Agriculture Dr. Akinwumi Adesina, and was launched in Abia State in the same year. In 120 days, over 1.2 million farmers bought their subsidized fertilizers using the e-wallet system. A total of 138,802.7 metric tons of fertilizer and 10,974.78 metric tons of seeds were distributed in 517 active redemption centres out of all the 804 centres spread across the Federation (Agbareyo and Ukagha , 2018), (Olagunju,2021).

Application of the GESS

The scheme is said to have effectively gotten the Government out of direct procurement and distribution of farm inputs and simultaneously bringing the private sector such as financial institutions, agro-dealers, suppliers, marketers, etc., into the value chain for agricultural inputs supply and distribution. Through the e-wallet farmer receive and pay for GESS from both the Federal and State Governments and are linked to agro-dealers, suppliers, extension services, financial institutions, etc. According to, more and more farmers are becoming technology savvy and getting involved with the new media to connect with other stakeholders at personal level.

For a farmer to participate, he or she must be above 18 years old, must have participated in a survey authorized by government to capture farmers' personal detailed information, he must own a cell phone with registered SIM card and have at least Sixty-Naira credit in the cell phone. The fulfilment of these conditions guarantees the insurance of an e-wallet vouchers to the farmer. The voucher is used to redeem fertilizers, seeds and other agricultural inputs from agro-dealers at half the (Agbareyo and Ukagha, 2018)

Usefulness of the scheme

Agbareyo and Ukagha (2018) carried out a study on the "Determinants of Participation of Farmers in the E-wallet Agricultural Input Delivery System in Abia State Nigeria" The result showed that the respondents perceived the E-wallet as helpful in input delivery. This implies that the Growth Enhancement Support Scheme through the e wallet system is useful.

Challenges

Some of the challenges of farmers in implementing the e-wallet approach include insufficient fertilizer and late arrival of inputs. These constraints occur due to delay on the part of agro dealers and the manufacturing companies. Furthermore, inadequate quantity of fertilizer subsidy is among the constraints to effective distribution in Nigeria. Low literacy rate among the farmers is another factor that makes it impossible for the farmers to access the inputs through the use of phone. Poor network many at times make it difficult to receive text messages with E-wallet system. The coverage of some of the network providers is restricted to particular areas hence, most farmers may have limited

network coverage, thereby posing challenges to farmers in getting their packages. (Agbarevo and Ukagha, 2018).

Digital Green (DG) approach in India, Tanzania, Ethiopia, Mozambique and Ghana

Rikin Gandhi started Digital Green (DG) as a project in Microsoft Research India's "Technology for Emerging Markets" team in 2006. The project started as a trust in 2008, and uses a digital platform to disseminate information on good agriculture practices (GAP) to small and marginal farmers to help improve crop yields. Digital Green's agriculture extension methods have greater efficacy and cost effectiveness than traditional agriculture extension methods (Technical Report, 2021).

Application and usefulness

Digital Green adopts a participatory approach to make videos on GAP in crop husbandry, from pre-sowing to production and post-harvest phases. The DG team partners with local public, private, and civil society organizations to disseminate these videos among small farmers to encourage GAP adoption. The DG registered its not-for-profit arm in the U.S. to undertake projects in other countries such as Mozambique, Ghana, Ethiopia, and Tanzania. Digital Green has helped thousands of smallholder farmers to increase food production in India by using modern technological advancements to uplift impoverished farmers (Tinsley & Agapitova, 2018). As a result, it has helped to improve the food security situation of farmers who adopted the good agricultural practices, (Olagunju, 2021).

Challenges

Some challenges encountered include; Inadequate penetration of telecom and internet connectivity, and erratic power supply, Limited aggregation of farmers and rural communities through farmer groups, cooperatives and producer organizations, higher cost of skilled human resources in African countries than in India. (Tinsley & Agapitova, 2018).

Mobilizing e-extension for Nigeria

There is no doubt, that insurgency in the northeastern parts of Nigeria, cattle rustling, banditry and kidnapping in the central, western and southern parts of Nigeria, are increasingly posing threat to effective extension service delivery. The traditional extension approaches which use the face-to-face interface and personal contact can no longer sustain the extension system in Nigeria. This calls for a more sustainable, robust and cost-effective system to complement the existing approaches. The e-extension approaches, if properly utilized, can serve as an effective means of linking farmers, extension service providers, agro-input dealers, financial institutions, govt etc. for proper bargaining.

The NFHL, GESS/e-Wallet and the digital green, all have unique features which can be harnessed for a more effective extension service delivery in Nigeria. A study by Emeana *et al.* (2020) revealed that great potential does exist for the adoption of digital technology in Nigeria. The study established that agricultural extension professionals in the country see the potential for utilization of digital tools to transform them from mere agents of extension into knowledge workers, engaged in bottom-up, demand-driven, pluralistic approaches to technology generation, assessment, refinement, and transfer.

Conclusion and Recommendations

The potential of e-extension to act as a bridging tool, assisting in the growth of agricultural development in Nigeria and other African countries is emphasized. Adequate power

supply, internet connectivity and training of extension workers in the area of e-extension are highly recommended. The integration of e-extension approaches will play a very important role in bridging knowledge gaps, suggesting that a significant number of farmers can be reached even with very few extension staff. Social networking is a modern medium for sharing ideas; communicating with, contributing to, and mobilizing for a cause; finding advice, and providing guidance. Social media have eliminated communication hurdles and built decentralized channels of communication and opened the door for everybody to have a voice and engage in a democratic manner. Furthermore, there is the need for a dateless e-extension service delivery system, in order to reduce the high cost of data needed to carryout e-extension services.

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