



Building Organizational Resilience of Public Extension System during Pandemic in Enugu State Nigeria

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Abstract

The study identified potential changes in the public extension system that could contribute to food system transformation during the pandemic. Document reviews, surveys, focus group discussions, and key informant interviews were used to achieve the study objectives. During the COVID-19 pandemic, most (96.0%) rural households had no extension contact resulting in challenges within the food production system. The annual quantity of yam produced by the respondents declined from an average of 5,700kg pre-pandemic era to 5,100kg during the pandemic. As a result of the pandemic, the already weak extension system was exposed to greater vulnerability due to weak capacity, poor competence, and technical know-how needed to drive the food production system transformation. Policy interventions are recommended to ensure that extension services are digitalized, human capacities are improved and adequate funding is available.

1. Introduction

There have been substantial concerns about food system transformation threats resulting from the COVID-19 pandemic because the food system has been disrupted in terms of food production (physical availability of food) (Sarka et al., 2021). This disruption affected the food security status of rural populations negatively and challenged global food system resilience (Nemes et al., 2021; Yang et al., 2022). This could have implications for the achievement of the majority of the Sustainable Development Goals, which is crucial for meeting the United Nations 2030 agenda for sustainable development (Máté and Rabbi, 2021).

At the beginning of the COVID-19 pandemic, most governments around the world imposed stringent lockdown policies to curtail the spread of the virus. This resulted in restricted mobility, reduced access to the market, and limited transportation of agricultural inputs, labour supply, and food supply chains, disrupting the agricultural production sector (Rahimi et al., 2022; Bene et al., 2021; Reardon et al., 2020). As a result of restrictive measures taken to limit the pandemic, food demand and supply were disrupted, resulting in higher food prices and lower household food consumption (Yang et al., 2022). Consequently, the COVID-19 pandemic has uncovered the fragilities of contemporary food systems (FAO, 2020; Webb et al., 2020) resulting in reduced agricultural yields (Dinesh et al., 2021) and may threaten the capacity of the current food system to provide the food needs of the expanding global population by 2050, estimated to reach 9 billion people (Pereira et al., 2020). Food production must undergo a deep structural transformation to ensure a more sustainable future.

Food system transformation would entail improving the uptake and efficient use of farm inputs as well as agricultural practices and technologies such that food production is more market-oriented, specialized, and better integrated into the food value chain (Ecker and Hatzenbuehler, 2022). Such transformation of the food system would require improved capacities, skills, and knowledge of farmers and are thus dependent on available formal and informal institutional/organizational supports. Agricultural extension systems provide one of the fundamental organizational supports that enable food system transformation. Agricultural extension services help farmers build their capacity to improve sustainable agricultural practices, including pest and disease control management, climate change adaptation, and providing inputs, services, and market linkages (Rawe et al., 2019; FAO, 2020). During a global pandemic crisis, extension services provision is vital information that would enable farmers to adopt safe healthy practices, maintain food safety, and respond to challenges affecting the food system (Even and Nyathi, 2020; Davis et al., 2021).

Conversely, the COVID-19 pandemic is expected to have long-term effects on the capacity of extension institutions to function optimally (Babu, 2020). This is because the COVID-19 pandemic poses new threats and challenges that can seriously jeopardize extension service provisions. In these challenging contexts, extension organizations are expected to be resilient. Extension organization resilience is defined as the ability or capacity of extension organizations to cope with the disruptions in food system activities

resulting from pandemic shocks and still operate optimally. For this to be achieved, extension organizations are expected to put up measures that would minimize the impacts of threats of the pandemic shocks and increase the speed of recovery of the organization (Annarelli et al., 2020).

In Nigeria, extension services are provided by public and private organizations (Madukwe and Anugwa, 2020; Ogunniyi et al., 2020). However, a key knowledge gap remains on how to improve extension organizations' resilience to support food system transformation during and after the shocks of the COVID-19 pandemic. Thus, using the ADP extension system in Enugu State as a case study, this study examined the vulnerability of the extension system as a result of the pandemic and the individual capacities and institutional support required to build the resilience of the public extension system. The research questions that guided this study are i. How vulnerable was the ADP extension system as a result of the COVID-19 pandemic? ii. What kinds of individual capacities and institutional support are required to build the resilience of the ADP extension system for sustainable food system transformation in Nigeria after exposure to pandemic shocks?

The outcome of this study will guide policy decisions aimed at enhancing the resilience of extension organizations to support food system transformation during the future occurrence of global pandemics.

2. Methodology

The study was conducted in Enugu State, Nigeria. It lies between Latitudes 5° 56'North and 7° 06'North of the Equator and Longitudes 6° 53'East and 7° 55'East of the Greenwich Meridian). Enugu State covers a land area of approximately 8727.1 km² (Enebe et al., 2020).

The study employed qualitative and quantitative methods of data collection. The study was conducted from February through April 2022 and elicited micro-level data on food production activities in the 2019 and 2020 planting seasons. Survey households were selected using a multistage sampling procedure. In the first stage, we purposively selected four local government areas (LGAs) out of the fourteen rural LGAs in the state based on the intensity of agricultural production activities. Secondly, 144 farm households were randomly selected across 12 town communities in the selected LGAs. The households were selected from a list of crop farmers provided by community leaders.

Qualitative data for the study were collected through key informant interviews, focus group discussions, and participant observations. The target population for the qualitative part of the study was extension administrative staff at ENADEP. There are 15 administrative staff at the management level in ENADEP. Focus group discussions were held with members of extension services actors at the management level in ENADEP comprising the Programme Manager, directors of the different units, and zonal managers. A convenience sampling procedure was used in selecting ten (10) participants for the focus group discussion. The basis for using the convenience

sampling procedure was the willingness of the extension workers to participate in the study and the availability of the information (Davis et al., 2021). Written informed consent was obtained from the FGD participants. Four key informant interviews were conducted with the Directors of Planning, Extension, Rural Institutional Development, and Technical Services, respectively. Mobile phone was used in conducting these interviews due to the challenges of in-person interaction due to the COVID-19 pandemic. Information elicited from the FGDs included the vulnerability of extension systems during the COVID-19 pandemic and institutional support for building the resilience of the ADP extension system to future shocks.

3. Results and Discussion

3.1 Extension contacts pre- and during the COVID-19 pandemic

Only 15% and 4% of the rural households indicated that they had access to extension services pre- and during the COVID-19 pandemic (Figure 1). Generally, the respondents had a very poor extension contact pre- and during the COVID-19 pandemic and they also considered extension service delivery as very poor. Before the COVID-19 pandemic, the few farmers who had extension contact received information on crop production technologies such as improved fertilizer application, soil conservation practices, improved land preparation, and crop management practices. Extension personnel were not recognized as essential workers during the lockdown and as such this affected farmers' access to critical crop production technologies needed for adequate food production. The very few farmers who received information from extension agents during the lockdown mainly got safety information on COVID-19 precautionary measures through SMS and WhatsApp messages. The farmers noted that they made no significant changes in their agricultural activities during the COVID-19 pandemic. This could have a very serious implication for food production system transformation and emphasizes the need to improve the productivity of small-scale farmers.

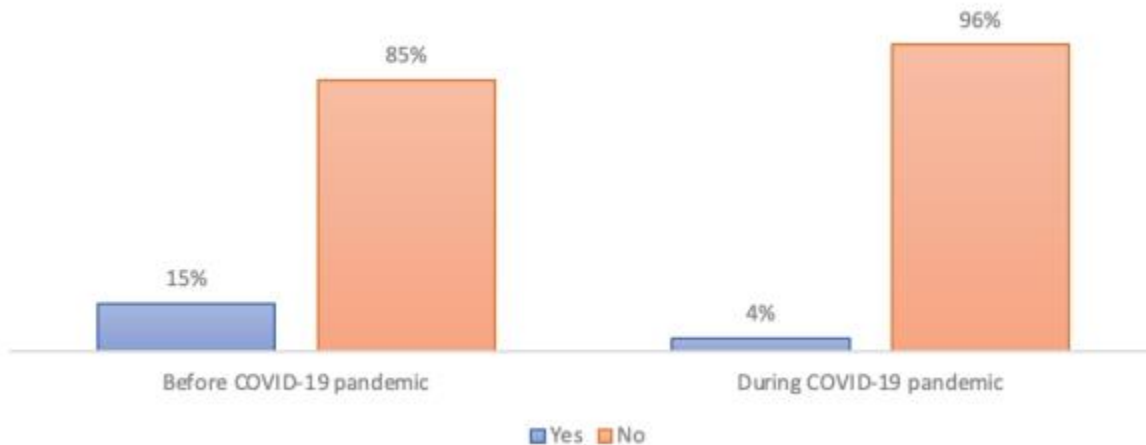


Figure 1: Access to extension services pre- and during the COVID-19 pandemic (Source: Field Survey, 2022)

3.2 Quantity of crops produced pre- and during the COVID-19 pandemic

The average annual quantity of crops produced in the year preceding the COVID-19 pandemic was about 5,700kg of yam, 2,750kg of rice, 2,600kg of bitter yam, and 650kg of beans, cassava, and maize, respectively. On the other hand, the average annual quantity of crops produced during the COVID-19 pandemic was about 5,100kg of white yam, 2600kg of rice and bitter yam, respectively, 650kg of beans, maize, and cassava, 450kg of melon and 400kg of cocoyam (Table 1). The COVID-19 pandemic led to a decrease in the production of virtually all the staple food crops identified by the respondents. This could be linked to disruptions in crop production arising from poor access to inputs, finance, and production technologies provided by extension services due to lockdowns during the pandemic. Specifically, there was a significant decline in the quantity of yam crops produced. This was attributed to the fact that the time frame for cultivating yam (January to June) coincided with the lockdown period. Other constraints to yam production were limited availability and high cost of inputs, shortage of labour and planting materials, limited access to credit, proper storage facilities, and market. Additionally, the farmers reported that restricted movements, which occurred at the beginning of the planting season, affected field activities such as land preparation, planting, and harvesting of farm produce. Also, the high cost of purchasing farm inputs due to hikes in transportation fares during the lockdown contributed to lower crop production. In congruence with this, Issa (2021) noted that the lockdown imposed by the government during the COVID-19 pandemic in Nigeria resulted in lower crop outputs due to reduced hectareage of farmland cultivated, poor access to farm inputs due to restricted vehicular movement and limited farm labour. In Southeast Nigeria, Ogechukwu et al. (2020) also reported that the COVID-19 pandemic thwarted the farming process thereby reducing farm labour availability and crop output.

Table 1: Quantity of crops produced annually pre-and during the COVID-19 pandemic

Crops	Pre-COVID 19 pandemic	During COVID-19 pandemic
	Average (Kg)	Average (Kg)
Cassava	650	650
Maize	650	650
White yam	5,700	5,100
Cocoyam	400	400
Rice	2,750	2,600
Bitter yam	2,600	2,600
Melon	500	450
Beans	650	650
Cucumber	300	250

Source: Field survey, 2022

3.3 Vulnerabilities in ENADEP during the COVID pandemic

The prohibition of public gatherings as a precautionary safety measure against the spread of the COVID-19 pandemic hindered the provision of agricultural extension services in Enugu State. Travel restrictions and lockdowns made it difficult for extension workers to reach out to farmers through conventional ways for agricultural advice and this affected the agricultural production activities of farmers. The key informants noted that the extension agents do not undergo sufficient periodic training needed to build their capacities to carry out effective extension services delivery. This has resulted in extension personnel with weak capacity, poor competence, and technical know-how needed to drive food system transformation.

The focus group discussants indicated that extension agents have poor access to and use of modern information and communication technologies (ICT) tools. The poor usage was attributed to poor knowledge and training on the operational use of modern ICT tools. This could have serious implications for the deployment of modern ICT tools by public extension agents in reaching farmers with essential information needed to sustain food system activities during the COVID-19 pandemic. Key informants also lamented the lack of adequate transportation facilities to reach rural communities regularly during the COVID-19 pandemic. Also, there are insufficient operational funds to cover routine training, and communication and to conduct extension activities such as the monthly technology review meetings, fortnightly training, and on-farm demonstrations. The result is limited and poorly executed extension activities in the rural communities and this has been detrimental to food system transformation.

Participants during the FGDs and KIs also stated that the systems and structures linking actors in the food system in Enugu State were weak due to dwindling funds, top-down extension approaches, and inconsistencies in the roles of key actors within the food system. The COVID-19 pandemic has exacerbated the negative effects of an already weak extension system and calls for the need to reflect on the high cost of a weak policy system in supporting food systems transformation. Despite the challenges bedeviling the extension service delivery in the state, ENADEP still has great potential to transform the food production system if it is revitalized.

3.4 Building Organizational Resilience of the Extension System for Food System Transformation in Nigeria

The COVID-19 pandemic is an unpredictable shock to the transformation of food systems in Nigeria with serious implications on the effective functionality of the ADP extension system. Resilience building should thus be an important strategy within the operation of extension organizations to ensure that extension services are adequately carried out and the extension systems bounce back to a better state arising from the disruptions of COVID-19 (Hynes *et al.*, 2020). This section highlights key policy measures that would assist in building the resilience capacity of the ADP extension system to adequately support the transformation of the food system in Nigeria. Based on the current status of the extension system presented in the above section, these

resilience-building measures are summarized in Table 2.

1. Digitalization of extension services

The movement restrictions and social distance regulations limited extension agents' face-to-face contact with rural farmers thereby threatening the food security status of farmers. This calls for a paradigm shift from the traditional face-to-face teaching method of extension approach to the use of digital tools in providing agricultural extension services to farmers and increased flexibility across the food supply chain. For example, one of the key informants said,

“ Rapid digitization is not only useful to build the resiliency of the extension system but also towards efficient delivery of innovations and early warnings to the farmers to support their resiliency”.

However, digitization would require building the competence and skills of extension agents and rural farmers on the use of innovative digital tools and smart farming technologies for the effective dissemination of information and feedback to the various food system actors (Samuel, 2021). Providing information to rural farmers using digital technologies will help to improve the use of inputs efficiently and reduce climate change footprints during the COVID-19 pandemic (FAO, 2020). There are varieties of mobile applications and digital platforms that can be deployed by extension agents to solve the problem of the information divide among farmers and other food system actors due to the COVID-19 pandemic. Some of them are YouTube, Zoom Conferencing, WhatsApp, Instagram and Interactive Voice Response (IVR), artificial intelligence, knowledge management platforms, drones, online marketing, e-extension platforms, blockchains, and the Internet of Things (Samuel, 2021; Chander & Rathod, 2020; FAO, 2020). Thus, it is important to strengthen the capacities of extension advisors and rural farmers to contribute effectively to the digitalization of food systems considering the current pandemic.

2. Strengthening the linkages between the ADP extension system and universities/agricultural research institutions

Strengthening the linkages between the ADP extension system and universities/agricultural research institutes would help extension service delivery to be more effective and responsive to the needs of farmers during the COVID-19 pandemic. There is, therefore, therefore need for a multi-stakeholder platform within the Nigerian public extension system to meet the changing needs. This can be achieved through developing a social network of stakeholders to be involved in learning, knowledge sharing, and partnership at national, regional, and international levels (Chander and Rathod, 2020). This will improve food production and the use of resources sustainably for the transformation of the food system (FAO, 2020).

3. Improving the capacities of the ADP extension system to carry out effective extension service delivery

The capacities of extension service providers in the ADP extension system need to be built to guide effective and efficient responses to the COVID-19 pandemic in the domains of improving food security, continuous agricultural activities, livelihood activities, and minimizing food supply chain disruptions. Thus, extension services need to be reinforced to rebuild food supply chains to be resilient to COVID-19 pandemic shocks. There is a need for continuous in-service training of extension service providers on the formulation of innovative practices needed to address the challenges of transforming the food system during pandemic shocks, particularly in the areas of marketing, value addition, and agribusiness (Chander and Rathod, 2020). In this regard, a key informant stated:

“It is very pertinent to build the capacities of extension workers to enable them to make substantial contributions to food system transformation and build farmers’ resilience as well. I suggest the need for a new curriculum for training extension workers and re-orientating their technical skills”.

The skills and competencies of extension staff also need to be upgraded to facilitate institutional linkages, organize producer and self-help groups, coordinate multistakeholder workers and pluralistic providers, and enable changes in their teaching strategy and approach using information and communication technologies (Chavula et al., 2022; Suvedi et al., 2023). This requires transforming the prevailing technology-driven and traditional top-down extension model, in the current ADP extension system, to a more market-oriented, decentralized, and farmer-led extension system (Suvedi and Kaplowitz, 2016). In turn, farmers will be equipped to carry out sustainable agricultural practices that are suitable for market opportunities.

4. Adequate and sustainable funding of the ADP extension system

One of the major dilemmas facing the ADP extension system in Nigeria is inadequate financial resources to build the capacity of extension staff to carry out innovative extension program activities in the field. Since the government poorly funds the ADP extension organizations, external funding through bilateral and multilateral donor agencies may be needed to finance adequate extension service delivery to farmers during the COVID-19 pandemic (Ogunniyi et al., 2020). In addition to the private sector, farmers and other food system actors should also participate in the cost-sharing of extension services for sustainable contribution to food system transformation. In line with this, a key informant noted:

“Public-private partnership can be a mechanism for resilience building. In this regard, the public sector is expected to educate the private sector on how to provide tailored extension services aimed at meeting the needs of food system actors. This could reduce the cost of extension by providing the right information through developing a network of input dealers and product aggregators who can help in knowledge sharing during shocks and help farmers bounce back. This public-private partnership will also help in the organizational resiliency of the extension system”.

The cost-sharing of extension services by farmers could be achieved in a variety of

ways, such as direct payment of extension services or indirectly through payment of membership fees of producer organizations, levies on processed or marketed produce, and tax revenues generated from crop and livestock produce (Ogunniyi et al., 2020).

5. Deployment of pluralistic, demand-driven, and participatory extension approaches

The increasing role of agricultural extension in providing the requisite services to meet the needs of farmers requires the deployment of different approaches to address the challenges of food system transformation in Nigeria. One such approach is the use of pluralistic, demand, and participatory extension approaches in the provision of extension services to diverse farmers (Ong'ayo et al., 2016). A practical demand-driven and participatory extension service delivery system is based on the principle that the services shall be driven based on the demands of the farmers. Also, the farmers can freely select service providers of their choice and the service providers will be accountable to the actors based on the services rendered (Ogunniyi et al., 2020). In addition to the co-existence of multiple extension systems and approaches, other features of the pluralistic extension are multiple information sources and diverse funding sources (Oladele, 2020). Furthermore, a key informant noted:

“Complementarity and substitutability among the actors and players must be mapped out and duplication should be avoided. The pluralistic extension can bring in competition but should not waste resources. Guiding the process of knowledge sharing through mapping the opportunities for actors and players and building an effective regulatory mechanism will help. Institutional strengthening for developing such agroecology-based approaches is key to the resiliency of the system. This requires capacity for the actors and players”.

The need for deploying such a pluralistic extension approach is anchored on the premise that extension service delivery mechanisms by different players from multiple private, public, and mixed sectors, employing participatory and demand-driven approaches would achieve the goal of transforming the food system (Oladele, 2020). In this way, extension services provided by the ADP extension system will become relevant, less expensive, effective, and responsive to the needs of diverse food system actors (Masangano et al., 2016).

6. Dynamic, legislated, and functional national agricultural extension policy

Establishing a dynamic, legislated, and functional national agricultural extension policy is a starting point needed to address the myriads of challenges affecting food system transformation during the COVID-19 pandemic due to an ineffective and inefficient ADP extension system. A legislated national agricultural extension policy is expected to harmonize the critical elements required to build the resilience of the ADP system to power a market-oriented and sustainable agricultural development using the food system approach. In line with this, a focus group discussant commented that:

“The need for a national policy framework and the enabling environment for the service providers to play their role is important for a strong extension system to emerge.”

Some of the critical elements needed for sustainable agricultural extension practice by the ADP extension systems are coordination of the efforts of the different agencies involved in agricultural extension service delivery in Nigeria, professionalization of agricultural extension agents, regular and sustainable funding sources, adoption of a cost-sharing strategy for extension services, effectively catering for the needs of farmers and mainstreaming donor support for extension intervention into existing structures for proper synergy to achieve the required impact of food system transformation (Davis et al., 2019).

Table 2: Resilience-building measures of ENADEP

Existing Status of ENADEP	Proposed Resilience Building Measures
Traditional face-to-face mode of communication is prevalent	The paradigm shift from the traditional extension approaches that include face-to-face interaction with farmers to the use of modern digital tools in the delivery of extension services, especially during future pandemic scenarios
Poor linkages between the extension system and other relevant stakeholders	A multi-stakeholder platform needs to be established within the agricultural extension system and linkages needs to be strengthened for sustainable transformation of the food system
Poor administrative and technical capacities of extension staff	There is a need for persistent in-service training of extension service providers in the areas of value addition, value addition, and agribusiness
Inadequate funding of the extension system	External funding through bilateral and multilateral funding agencies as well as cost-sharing by food system actors can provide the ADP extension system with adequate and sustainable funding
Supply-driven information flow between extension service providers and food system actors	Implement a needs-based practical pluralistic, demand-driven, and participatory extension service delivery for farmers
National extension policy is not yet functional	Full implementation of the national extension policy is expected to harmonize the key elements need to build the resilience of the ADP extension system to support the transformation of the food system

Source: Authors' compilation

Conclusion and Recommendations

The COVID-19 pandemic reaffirmed that public extension organizations in Nigeria lack sufficient capacity to contribute to the sustainability and resilience of the food production system. The COVID-19 pandemic provided an opportunity to learn more about vulnerabilities in the public extension system and to identify necessary restructuring that would further strengthen the resilience of the ADP extension system to a wide variety of future crises and challenges. Extension organizations need to make profound changes

in organizational capacities to transform food systems and adequately support rural farmers due to the changes in the context and environment in which they operate, especially in the light of the emergence of the COVID-19 pandemic. Therefore, the unforeseen shock of COVID-19 highlights the need for a shift from “business as usual” policies to a more forward-looking set of policies that invests in the productivity, sustainability, and resilience of the ADP extension system.

The government should establish defined policies on the recovery of extension organizations after exposure to shocks. Also, adequate financial resources need to be available to help rebuild extension systems. The capacity of extension workers needs to be upgraded so that innovative digital platforms can be used in disseminating relevant information about the pandemic and other agricultural practices to farmers and other food system actors. Digital-enabling opportunities should also be provided to extension service providers through technical training and the provision of ICT-enabled infrastructure to enhance their performance in transforming the food system in Nigeria, especially during future pandemics.

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