

Mitigating the Impact of COVID-19 on Rural Farm Families in Nigeria through Innovative Information Transfer

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Abstract

The role of new technologies in driving agricultural sustainability is crucial for the socio-economic survival of rural households in Nigeria. The COVID-19 pandemic impacted the livelihood of farm families as they had difficulties accessing inputs, supplies and farm labour needed for maximum productivity of their farming enterprises, and in selling farm produce due to the lockdown restrictions policies imposed by the government. Additionally, the income of farm families was affected as a result of spoilage of perishable produce. This review highlighted the impact of COVID-19 on agricultural activities of rural families, constraints to accessing agricultural information, responses of the government in providing information to farmers and the innovative information sources for improved livelihood outcome. This review concluded that innovative information dissemination methods can enhance the livelihood of farm families in the face of crisis like the COVID-19 outbreak.

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Background to the Study

The Coronavirus disease, which broke out in China in 2019 and declared a global Pandemic by the World Health Organization in March 2020, was first reported in Nigeria on February 28, 2020. The disease, which was code named COVID-19 has recorded over 40 million cases and more than 1 million deaths globally (WHO, 2020). The COVID-19 situational report from the Nigerian Centre for Disease Control (NCDC) indicated that 1,112 deaths have been recorded, with 59,127 confirmed cases and 50,593 patients discharged as of October 2, 2020 (NCDC, 2020). While the health impact of the disease has been low in comparison with global narratives, the outbreak of the disease has highly impacted the livelihood of millions of families in Nigeria, particularly the rural families whose livelihoods are sensitive to fluctuations and emergency situations like COVID-19.

In order to reduce the spread of the disease in Nigeria, several measures were taken by the government such as social distancing that limited large gatherings, lockdown of public and private places and restrictions of movements. These measures disrupted the agricultural activities of rural farm families, making it difficult for them to access information on agronomic practices, denied them access to inputs and markets, leading to hike in prices of inputs, wastages of harvested produce due to transportation challenges and reduced income to meet their family needs, hence, putting their food security and the food security of the country at risk.

Information is key to agricultural development and is required in all the stages of the agricultural value chain, from decisions on what to grow, when to plant their crops, when and where to sell produce in order to maximize gain (Food and Agriculture Organization, FAO, 2014). For rural farm families in Nigeria, accessing agricultural information has been a longstanding challenge. The poor state of rural infrastructures, low literacy level, limited access to communication channels and extension services constitute barriers to the availability of agricultural information for the improvement of their livelihoods (FAO, 2018). Given the threats that COVID-19 posed to the livelihoods of rural farm families due to their inability to access information needed for their livelihood activities, up-to date information on the sources, availability and costs of agricultural inputs, agricultural techniques that can enhance their production capacities, and markets for their produce becomes imperative.

Hence, this paper is a review of how innovative information transfer mechanisms can be used to mitigate the impact of COVID-19 on rural families, given the wide range of opportunities that the internet, mobile phones and social media platforms offer in improving the livelihood of rural farm families. The paper identified measures that were adopted to contain the spread of COVID-19 in Nigeria and how such measures impacted their livelihoods, the response of the government in addressing the information needs of rural farm families during the lockdown and innovative information transfer technologies that can be leveraged on to improve the livelihood of rural farm families in post COVID-19 Nigeria. This paper draws evidence from secondary literature sources such as research articles, internet sources, website publications of the Nigerian government and organizations like the World Bank and the Food and Agriculture Organization.

Constraining Factors of COVID-19 that Impacted the Livelihood of Rural Families in Nigeria

Following the outbreak of the COVID-19 pandemic in Nigeria, several measures were put in place by the government to contain the spread of the disease. There was lockdown of both public and private sectors, closure of schools, religious gatherings, markets, and other social gatherings, movement restrictions to reduce physical contacts as social distancing became a campaign to discourage gatherings as a way of ensuring the health security of the Nigerian populace. However, while these measures were well intended to safeguard the health security of the public, they disrupted the agricultural activities of rural families with implication for their food security and exposure to worsening poverty outcomes.

a. Social Distancing

Social interaction is a very important aspect of rural culture in Nigerian context, is as old as any tradition. Farmers are known to interact and share farm information through social gatherings either within their communities or with other social groups in neighbouring communities and such social gatherings are the pivot points through which agricultural extension agents interact with farmers. The social distancing measure that forbade social gatherings constituted barriers to the social interactions of farmers' groups and the social network of information flow between extension agents and farmers in Nigeria.

b. Lockdown

The closure of public and private sectors in Nigeria closed opportunities for rural farm families to access resources for their productive activities. The lockdown measures which led to situations where people had to work from home, crippled the extension-farmer social networking relationships as it interrupted the movement of extension agents to farmers' communities during the period such that information needed for agricultural activities were not readily disseminated to the farmers. The lockdown also posed challenges to farmers' access to agricultural inputs such as seeds, fertilizers, credit etc.

c. Interstate Movement Restrictions

The interstate movement restrictions disrupted the transportation, distribution and marketing of agricultural produce from the rural areas to urban centres, leading to interruptions in food supply chain, wastages of perishable crops and loss of income for farm families (Wiggins, 2020; World bank, 2020).

d. Border Closures

The restrictions of movement around national borders in Nigeria affected the movement of agricultural produce meant for exports. This measure interrupted the livelihoods of rural farm families who produce for exports as their access to global markets were interrupted due to the border closures. The border closure also led to high cost of inputs as there was global restrictions on movement of goods and services.

Impact of COVID-19 on Rural Farm Families in Nigeria

Given the narratives of the poor state of the socio-economic environment in which the rural families derive their livelihood and the constraints that undermine their socio-

economic development, the outbreak of COVID-19 in Nigeria further complicated the livelihood challenges of rural farm families particularly with the containment measures that were put in place by the government. Wiggins (2020) observed that the impact of COVID-19 will not be evenly experienced; that while the disease may affect the health of some, the economic resources of some others may be affected in some other households, yet even geographically, the impact will be differently felt, especially for rural families as they may experience changes in the type of farming systems, the types of crops produced, changes in labour dependence and purchased inputs as well as supply chain channels that connect rural families to markets.

a. Interruption of Extension Services to Farm Families

The timing of COVID-19 outbreak in Nigeria coincided with the main agricultural activities in the country. Access to information is very relevant to rural farm families as they are needed for decision making on what, when and how to carry out their farming activities, markets for inputs and sales of their produce for enhanced livelihood. In Nigeria, the number of extension agents to farmer population is low, ranging from 1:5000 to 1:10000 (Feed the Future, 2017; Davis, Lion & Arokoyo, 2019), with only 6% of rural households having access to extension services (FAO, 2018). The COVID-19 containment measures further crippled the farmers access to extension services due to the closure of government offices and the social distancing measures that prevented large gatherings and as a result, farmers were denied information that are needed for the agricultural season.

b. Disruptions in Agricultural Activities

Movement restrictions and lockdown measures disrupted the rural families' access to productive inputs such as seeds, fertilizers, financial resources etc. the border closures which interrupted the importation of agricultural inputs and the movement restrictions that disrupted the transportation chain led to high costs of inputs like seeds and fertilizers (Wiggins, 2020; World Bank, 2020). A study by Consultative Group to Assist the Poor (CGAP, 2020) in Africa noted that COVID-19 affected the social interactions of farm families as it prevented the informal social contributory savings that serve as alternative means of income for rural families, making it difficult for members of such groups to access their savings in order to purchase inputs and the other opportunities that such informal social financial support base offers.

c. Disruptions in Labour Supply

The resilience that rural families derive through the remittances from seasonal migration also suffered shocks due to the pandemic. The seasonal migration provides safety nets for rural households, as the males usually migrate to other areas in search of labour to raise funds which is sent to sustain the families during off-season. As a result of COVID-19 outbreak, these migrants were forced to return to their localities due to the movement restriction in order to be with their families during the pandemic crisis. CGAP (2020) reported that migrants who could not report to their families before the border closures, had their families exposed to economic hardships as the remittances to their family members were either reduced or outrightly stopped, further reducing the resilience of such families.

d. Disruptions in the Transportation and Distribution of Agricultural Inputs and Farm Produce

When the lockdown measure was first imposed in Nigeria, markets were also banned from opening. However, due to the outcry of the burden of the measure on food supply, food markets were eventually exempted. However, the limitations of interstate movement constituted barriers to the transportation of agricultural produce from rural areas to urban centres (COOPI, 2020). In another vein, the law enforcement agents, who were assigned to restrict movements of individuals resorted to extortions of transporters, which also led to hike in cost of transportation and increased costs of both raw agricultural inputs and food items, especially in urban areas. The disruptions created by the containment measures also led to spoilage of perishable crops, with implication for the income needed for the purchase of inputs and food security of the rural families (FAO, 2020).

e. Exposure to Food Insecurity

The disruptions in the transportation and distribution of farm produce to sales points, the problems of spoilage due to poor sales as a result of inability to access markets due to the measures, impacted the livelihood of rural families and put their food security at risk, particularly for the poor whose number of meals may be compromised due to COVID-19 impact on their livelihood, as they may be forced to sell their assets in order to mitigate the impact of COVID-19 on their livelihoods (CGAP, 2020; FAO, 2020; Wiggins, 2020).

Government Responses to the Information Need of Rural Farm Families During the Lockdown Period in Nigeria

Government response in providing information to farmers in Nigeria has primarily been through electronic old media sources like radio and television and print media sources like pamphlets, newsletters as well as direct contact by extension agents. Although radios and televisions were used in disseminating information during the lockdown, their effectiveness is questionable given that there was lockdown that affected all sectors of the economy. Irrespective of the mode of information transfer that was used, the preparations of the required messages to be disseminated were subject to the availability of personnel and other logistics that are necessary for the transmission of such messages. For instance, only a limited number of government officials were allowed to work during the period, and these are the senior cadre, who may not be directly involved in the preparation of such intended messages. Further, personal interaction with a number of extension personnel, both in research institutes and in the ADP indicated that contacts with farmers during the lockdown were disrupted and that the few farmers who needed information called for clarifications through their mobile phones. Hence, it is obvious that there was breach in communicating agricultural information during the COVID-19 outbreak in Nigeria, thereby underscoring the need for a paradigm shift to innovative means of providing information to farmers that are not sensitive to emergencies like COVID-19.

Conceptualizing Digital Technologies and Theoretical Clarifications

Innovative information transfers are new methods or practices that facilitate the transfer of information using digital technologies. Digital technologies have been used to provide services such as e-health, e-education, e-agriculture and digital financial services (FAO, 2014; Anderson, Marita, Musiime, and Thiam, 2017; World Bank, 2020). The revolutions of technology that brought about the development of the internet, mobile phones and social media platforms have transformed social interactions, creating unhindered networking that is fast enhancing the livelihoods of populations globally. They have become important tools in information seeking and dissemination in all disciplines, including agriculture where they have been used for accessing agricultural inputs, generating market information, financial transactions, consult agricultural experts on practices for improved production and for general agricultural information (FAO, 2014).

The United Nations (UN) (2017) defined digital agriculture as the use of new and advanced technologies, integrated into one system to enable farmers and other stakeholders to improve food production. They help farmers to make informed and appropriate decisions that can easily be implemented and provide them with real-time feedback on actions taken (UN, 2017). IFAD, (2019) amplified the relevance of innovative digital technologies in rural development, stating that they provide opportunities for rural families to access markets, processing and knowledge. In rural areas, internet and mobile phones have been used by farmers to access and share information in decision making on timely land preparation, harvesting, storage, processing and marketing (Evans, 2018).

According to FAO (2014) mobile phones have been proven as the most effective modern information and communication technology that are accessible to rural farm families. However, the effectiveness of mobile phones in transmitting agricultural information to rural farm families will require the availability of power supply, mobile phones accessories, improvement in the literacy levels of rural families (Abraham, 2007; Ahmed and Laurent, 2009; Falola and Adewumi, 2011).

Studies on the impact and use of digital technologies in providing information to rural farm families have been researched and documented in scholarly literature. Abraham (2007) considered how digital technologies have been used to drive the development of the fishing industry in India, Alhassan and Kwakwa (2012) investigated the use of mobile phones by small scale farmers in Northern Ghana. In Nigeria, Falola and Adewumi, (2012) investigated the constraints that mobile phones pose to agricultural production in Ondo State; Ogunniyi and Babatunde (2016) investigated the use of mobile phones for agribusiness for farmers in South-west Nigeria while Evans (2018) analyzed how mobile phones and the internet contributed to agricultural development in Africa. This study contributes to the body of knowledge by understudying how digital technologies like the mobile phone using Short Message Services (SMS) and Unstructured Supplementary Service Data (USSD), and internet enabled applications using social media platforms can advance the transfer of information to rural farm families to mitigate the impact of

COVID-19 on their livelihoods due to their inability to access agricultural information; taking into consideration, the socio-demographic challenges that could hinder the opportunities that these technologies offer.

Mitigating the Impact of COVID-19 on Rural Livelihoods Using Innovative Information Technologies

In order to address the longstanding challenges of providing information to rural farm families, especially in view of COVID-19 disruptions in the social interactions between rural families and the conventional means of information transfer, the need to explore innovative technologies so as to ensure the farmers' agricultural activities are not disrupted, is imperative. This will help to keep farmers abreast of global dynamics in the practice of agriculture and help them to access markets either for inputs or for marketing their produce, using innovative digital technologies like the internet, mobile phones and social media enabled applications in times of emergencies like the COVID-19.

The use of modern communication technologies in Nigeria has been on the increase since they were first introduced into the country. According to Global System of Mobile Communications (GSMA,2018), the mobile industry in Nigeria contributes about \$21 billion to the Nigerian economy, representing 5.5% of the National GDP and provides employment to an estimated 500,000 people through direct and indirect employment. The Nigerian Communications Commission (NCC, 2020) report revealed that the number of active mobile phone users in Nigeria increased from 148.8 million in April 2017 to over 190.3 million by April 2020. The report also indicated that the number of GSM network subscribers increased from 184.4 million in December 2019 to 196.0 million by June 2020. Additionally, GSMA (2018) report also revealed that about half of the mobile phone users in Nigeria are internet subscribers, with an estimated 53 million smart phone users, which is expected to increase to about 144 million by 2025. Given these narratives, it is obvious that the digital presence in Nigeria is high and can substantially be leveraged on to provide farm information to rural families in post COVID-19 Nigeria, for accelerated agricultural and rural transformation.

Digital technologies and applications that can be used for information transfer to rural families in Nigeria in order to mitigate the impact of COVID-19 on their livelihood, given the dynamics of communicating agricultural information will include the following, among others:

- a. **Development of Agricultural Information Websites:** The challenge of accessing agricultural credit for production and processing activities can be circumvented through the development of agricultural websites where agricultural information on agronomic practices, prices, markets, financial services and social interactive forums can be posted for farmers' benefits, taking the multiplicity of ethnicity in Nigeria into consideration. There are proliferations of individual and private organizations' websites that provide agricultural information on Nigeria, the credibility of many of those websites are questionable as instances of farmers who have been fraudulently swindled through such mediums are commonplace.

However, where the government develop and communicate credible websites to farmers, the needed information that is required for improving rural livelihood will be readily available and accessible. While the use of websites may not serve the information needs of the older, non-literate farmers, it will sustain the interest of the youth in agriculture, through the government's active engagement in the internet by creating sites that provide information to young farmers. Such websites can also provide information to consumers about the availability and price of agricultural produce which will help to increase visibility and patronage of farm produce, thereby reducing the wastes that are associated with limited access to markets.

- b. Use of Mobile Phone Short Message Services (SMS):** SMS is an effective mobile phone tool that provides information to millions of rural families (FAO, 2014). Since basic mobile phones do not necessarily require internet connectivity for information transfer, they have served the needs of rural households on needed agricultural technologies and market information. In Nigeria, the use of SMS has been proven effective as e-wallet technology that was used under the Agricultural Transformation Agenda to disseminate information about agricultural inputs such as fertilizers, seeds etc. to farmers recorded success as an estimated 14 million rural farmers where reached using the technology (Federal Ministry of Agriculture and Rural development (FMARD, 2016). The success SMS in transmitting information is also evident in its use by the Nigerian Centre for Disease Control (NCDC), which is currently using SMS to send COVID-19 awareness and containment messages to millions of Nigerians. However, in order to use the method to successfully drive agricultural information transfer to rural farm families, will require collaboration between the government and information and communication industries.

The use of SMS is relevant in reaching older non-literate farmers, who may not be able to operate mobile phones that require internet connectivity due to their low literacy levels and those who lack the financial capabilities to obtain internet enabled mobile phones. Additionally, the method will be effective in disseminating agricultural information among rural social networks, compared to other sources of information. Furthermore, the averseness to agricultural risks and innovations by uneducated farmers can be circumvented through the social interactions that mobile technologies provide as their interactions with other farmers will help to bridge the gap of farmers' knowledge on agricultural practices and processes that are ordinarily beyond their knowledge level.

- c. Unstructured Supplementary Service Data (USSD) Codes:** USSD is a mobile communication protocol that is used to send text messages, similar to SMS. USSD uses codes that are made up of characters in mobile phones and are used to establish communication between a network or server and a mobile phone and can be used for mobile financial services, information sharing, especially in

marketing related issues (Rosencrance & Gonzalez, 2020). Since USSD codes do not require internet connectivity like SMS, they can also be used to send agricultural information to rural farm families. Research information on new technologies, prices of inputs and harvested produce, weather forecasts can be made available to farmers using USSD codes.

- d. **Video messages:** Pictures provide an effective way of communicating information, especially for the educationally disadvantaged populations, like the rural farm families in Nigeria. This method, though will require the availability of smart phones, can be used to communicate research findings and other agricultural information to rural farm families which can be shared with their social networks in the communities.
- e. **Online Social Media Community:** this can be achieved by adopting the social groups of farmer's associations, with the support of extension agents. Social media platforms such as Facebook, WhatsApp, Twitter can be formed for farmers' groups and coordinated by government officials, especially extension agents, with the aim of providing farmers in the enclave with the required information, while feedback can be sourced from the same source. This approach can be used to reach young farmers and educated farmers that possess smartphones that can enable the use of these applications and where this is achieved, such information can flow to other farmers in the communities through their social networks.

The use of digital technologies for providing information for rural farm families in Nigeria may not be possible, given the myriad of problems that confront the socio-economic environment in which they derive their livelihoods. The challenges of low literacy levels, multiple ethnic groups, poor road networks, poor electricity, inadequate rural media or telecommunication services, lack of income to purchase modern communication gadgets such as mobile phones, limited interactions with the formal financial services and low knowledge on the usage of digital tools (FAO, 2014) may cripple the potentials of these technologies.

In order to maximize their benefits, critical infrastructures such as power supply, communication infrastructures that will enhance their connectivity with the global community have to be improved. Also, since SMS has been successfully used during the Agricultural Transformation Agenda and by the NCDC to relay information to mass populations in Nigeria. The effectiveness of digital technologies for agricultural information transfer to rural families will depend on how the information is designed; customizing digital information to capture the unique characteristics of the farmers in terms of their demographics and literacy levels is imperative. Information for the rural farmers need to be provided in the language they understand and in formats that is usable to them (FAO, 2014).

Conclusion and Recommendations

Undoubtedly, the impact of COVID-19 on rural farm families will not only be loss to the rural households but also threaten the food security of the country. Disruptions in farmer's access to information, access to inputs and markets due to COVID-19 interrupted the agricultural activities of rural farm families, that led to loss of crops and reduced income to meet the needs of rural families. In order to mitigate the constraints to the agricultural activities of rural farm families as a result of COVID-19, especially in the farmer's access to information about how to obtain inputs, agricultural technologies for improved output and markets, and to avoid such disruptions in case of future emergencies, digital technologies such as mobile phone and internet enabled applications and services are proffered.

Hence, this paper recommends that:

1. As a way of ensuring that food supply is not disrupted in the event of emergencies, agricultural channels for inputs, processing and marketing should be maintained with appropriate measures to ensure they are not affected by imposed regulations to address such emergencies.
2. Public-private partnerships remain a major contributor in driving rural development. The government has to collaborate with stakeholders in the communication and information technology industry in order to actualize the opportunities that digital technologies offer for a transformative rural Nigeria that can drive the food security of the country in a changing global space.
3. There is need to improve digital enabled services to rural areas in Nigeria by providing adequate infrastructures that will ease the agricultural information transfer.

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