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Impact of COVID-19 and lockdown policies on farming, food security, and agribusiness in West Africa

B.A. Ojokoh¹, O.S. Makinde², L.S. Fayeun³, O.T. Babalola⁴, K.V. Salako⁵, F. Adzitey⁶

¹DEPARTMENT OF INFORMATION SYSTEMS, FEDERAL UNIVERSITY OF TECHNOLOGY, AKURE, ONDO, NIGERIA; ²DEPARTMENT OF STATISTICS, FEDERAL UNIVERSITY OF TECHNOLOGY, AKURE, ONDO STATE, NIGERIA; ³DEPARTMENT OF CROP, SOIL AND PEST MANAGEMENT, FEDERAL UNIVERSITY OF TECHNOLOGY, AKURE, ONDO STATE, NIGERIA; ⁴DEPARTMENT OF COMPUTER SCIENCE, FEDERAL UNIVERSITY OF TECHNOLOGY, AKURE, ONDO, NIGERIA; ⁵LABORATOIRE DE BIOMATHÉMATIQUES ET D’ESTIMATIONS FORESTIÈRES, FACULTÉ DES SCIENCES AGRONOMIQUES, UNIVERSITÉ D’ABOMEY-CALAVI, COTONOU, ATLANTIQUE, BENIN; ⁶DEPARTMENT OF ANIMAL SCIENCE, UNIVERSITY FOR DEVELOPMENT STUDIES, TAMALE, ATLANTIQUE, GHANA

1. Introduction

Infectious diseases are not new to Africa. Outbreaks of diseases such as Ebola, meningitis, Lassa fever, cholera, yellow fever, and malaria have at one point or the other ravaged the continent. Many of these have been successfully curtailed with occurrences in limited geographic areas. For instance, in 2014, the Ebola virus disease affected some countries in West Africa (WA), especially Guinea, Liberia, and Sierra Leone. Lassa fever is also almost a yearly occurrence in some parts of WA [1]. However, the impact was localized in the areas of prevalence. The coronavirus disease 2019 (COVID-19), which is also an infectious disease, was first identified in December 2019 in Wuhan, China, and has since spread globally [2]. COVID-19 was declared a global pandemic on March 11, 2020, by the World Health Organization [3].

A pandemic is an epidemic (infectious disease) occurring over a wide geographic area, crossing international boundaries, and usually affecting a large number of people [4]. It is capable of increasing morbidity and mortality rates leading to substantial economic, social, and political disturbances. The tendency of pandemic occurrence might be due to climate change as well as increased urbanization and globalization. Thus pandemics will always occur as long as humans and infectious pathogens coexist. Proactive measures through national and international policies have focused on...
reducing transmission by personal protective or environmental measures (for example, handwashing and wearing of face masks), reducing the spread in the community (by isolating and treating patients, closing schools, and prohibiting mass gatherings), limiting the international spread (by closing borders and airports, traveler screening, etc.), and improving risk communication [3] and vaccination. These measures help build preparedness and health capacity.

After the severe acute respiratory syndrome (SARS) pandemic in 2003 and avian influenza, the international community has made progress towards preparing for and mitigating the impacts of pandemics [5,6]. However, significant gaps and challenges exist in global pandemic preparedness. For instance, the outbreak of the 2014 Ebola epidemic in WA has exposed gaps related to the timely detection of disease, availability of basic care, tracing of contacts, quarantine and isolation procedures, and preparedness outside the health sector, including global coordination and response mobilization [7]. These gaps are especially evident in resource-limited settings and have posed challenges during relatively localized epidemics, with dire implications for what may happen during a pandemic.

The spread of COVID-19 has made many countries, including those in WA, reel out and implement a number of measures and policies to curtail the virus. Some of these measures, which include the temporal “lockdown,” that is, the closure of land, air, and sea borders; schools, colleges, and universities; stores; and markets, and the restrictions involving ban on all social, political, and religious gatherings, are taking their toll on each country’s respective economies. It is well known that epidemics, and in more specific terms, pandemics such as this, would impact economies at national or regional level due to restrictions on movement, goods, and services. For example, the Ebola epidemic in Guinea, Liberia, and Sierra Leone was reported to have had a severe impact on the economy of these countries [8]. In a different report by the WHO, the outbreak triggered a significant loss of growth in the private sector just as it posed a major threat to food security. The latter was as a result of the disruptions in the entire agricultural value chain. Several measures put in place caused agricultural production to wane and also hampered cross-border and domestic trades.

The impact of situations like this is often felt by every sector of the economy, but it is more severe in some than the others, especially in the health and agricultural sectors. During pandemics, drugs and food are vital for survival. Most farmers in WA are resource limited, thereby making them vulnerable. According to Bloom et al. [9], vulnerable people are likely to suffer most from an outbreak, as they may have less access to healthcare and finance. Even the few commercial farmers are not left out, as many of the policies put in place to curtail the spread of the diseases affect them directly. Another major challenge hammered on by Bloom et al. [9] was the hindered marketing of produce due to food stores and shopping malls that are shut. This would invariably slow down cash flow in the hands of food vendors and farmers, and this might hinder farmers from returning back to farms in due time for more production.
COVID-19 is disrupting some agricultural activities and supply chain in WA. The cropping system in WA is mainly rainfed and rain had just commenced when COVID-19 broke out in the region, when majority of crop farmers were planting. Currently, inputs (planting materials, agrochemicals, and fertilizers) are scarce. Livestock and fish farmers are badly hit due to the lockdown particularly in the marketing of produce due to food stores, hotels, and shopping malls that are shut. This reduces cash flow among the food vendors and farmers, thereby discouraging farmers from continuous production. Similarly, there are disruptions in supply chains because of transportation problems and other issues. COVID-19 is an unprecedented challenge for WA; its large population and the economy’s dependence on farming make lockdowns and other social distancing measures hugely disruptive.

Various governments and nongovernmental organizations (NGOs) outside Africa have recognized the challenge posed by COVID-19 and have responded aggressively. Such instances are the efforts in India where the government put in place measures to lessen the impact of COVID-19 on the country [10]. The efforts included a 21-day national lockdown with some exemptions for farm operations, protecting farmers by regular testing and ensuring they practice social distancing, ensuring farmers have continuous access to market and the needed inputs, adding farmers and agriculture workers to government assistance packages, ensuring that the supply chain functions effectively, among others. In the United States, Reidy et al. [11] indicated that the agricultural industry was labeled as critical and allowed to operate under increased hygienic operations despite lockdown. In addition, major agribusinesses were allowed to operate under stricter hygienic and sanitary conditions. In Europe, flour millings are working flat out to satisfy demand [11]. According to the report of the World Economic Forum [12], COVID-19 is worsening food insecurity in Africa; in that, lockdown measures have hampered internal food supply chains stopping production, locust swarms have destroyed crops especially in Eastern Africa, and the availability of food for import from other continents has been reduced. Furthermore, the World Food Programme [13] reported that COVID-19 will negatively affect the economic sectors (especially agriculture, extractive industry, and tourism), migrant remittances (very important income sources for households), and subsistence farming and inputs for the same in WA and Central Africa. A study conducted by Deguenon et al. [14] on the knowledge status and potential impact of socio-economic factors on the spread of COVID-19 in WA countries found a sharp decline in the use of public transport and an increase in the price of hydroalcoholic gels.

As at the time of this study, we had found no documented work, specifically on WA, with respect to the impact of COVID-19 and the lockdown policies on farming, food security, and agribusiness. Our project therefore aims to raise awareness as well as assess the disruption issues that farmers and farming systems have as a result of staying at home, lockdown, social distancing, and restriction of interborder movements caused by the outbreak of COVID-19. We also want to propose policies and provide scientific
measures that can be adopted to address these disruptions and mitigate such future occurrences in case other pandemics or such issues arise in the future. The study reported in this work involved data collection from two West African countries, Nigeria and Ghana, to identify the immediate problems farmers are faced with since the outbreak and what will likely happen if the situation extends longer than expected.

2. Methods

2.1 Survey planning and data collection

An in-house list of potential respondents was created for the research by compiling a database of farmers with public profiles on Google MyBusiness and Google Maps. By querying the Google search engine, the contacts registered on business profile pages were obtained. Query terms included “location”+farms (like Akure farms), poultry farms, and livestock farms. The localized results provided by Google were then expanded by using the “More Places” feature.

After compilation, the farmers were contacted via SMS and the project was introduced to them. They were asked to contact via the WhatsApp application or directly use the online questionnaire if they were interested in participating in the project. The second group of farmers, separate from the previous, was contacted physically and the hard copy of the questionnaires were distributed to them. The third category of farmers and personnel involved in agri-related businesses was contacted through social media—Facebook and WhatsApp, sharing to farmers individually and to farmers’ groups. There was no incentive(s) offered or given for participation.

The questionnaire used in this research was developed in the English language and included questions pertaining to this study, particularly country, gender, age, type of farm or farming activity, lockdown status, lockdown preparedness, and lockdown effects (Table 11.1 contains a description of these questions).

| Question                                                                 | Response type                                                                                                                                 |
|--------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| In what country is your farm located?                                    | Close-ended: a list of countries were presented, it included all West African countries                                                     |
| Gender                                                                   | Close-ended: male or female                                                                                                                  |
| Age                                                                      | Close-ended (ranged): below 30 years, 31–40 years, 41–50 years, above 50 years                                                            |
| Has there been a lockdown at your location?                              | Close-ended: Yes or No                                                                                                                      |
| Were you prepared to handle the situation with the current COVID-19 crisis in your farm? | Close-ended: Yes or No                                                                                                                     |
| How do you rate the impact of COVID-19 and lockdown policies on your farm or business revenue? | 5-Point Likert scale: very negative, negative, neutral, positive, very positive                                                          |
| What kind of farm or agribusiness do you operate?                        | Close-ended: multiple selections allowed (see Fig. 11.1 for the list of activities provided)                                                  |
The survey was conducted in two WA countries, Nigeria and Ghana. A range of farmers involved in different farming activities and in different agriculture-related activities participated in the survey. Fig. 11.1 depicts the categories of people who responded to the survey. The most common businesses among respondents are poultry, livestock, raw crop, fishery, agri-retail, food processing, veterinary, direct market sales, professional services such as consulting and legal, specialty/produce/fruit, feed industry, nursery/landscape, equipment dealer/service, and agritourism.

Data used for this analysis was collected from the period of April 16, 2020, to April 29, 2020, a span of 13 days. A total number of 303 respondents were involved, and none were invalid.

2.2 Statistical analysis

Chi-square test of independence is often used to investigate if the null hypothesis that two nominal variables are independent is true against the alternative hypothesis that the nominal variables are dependent on each other at a chosen level of significance. However, in case of a similar problem conditional on a third nominal variable, the Cochran-Mantel-Haenszel test [15] is more appropriate, hence its use in this study. In fact, the Cochran-Mantel-Haenszel test investigates the null hypothesis that two nominal variables are conditionally independent in each stratum, assuming that there is no three-way interaction [15]. The test rejects the null hypothesis at \( \alpha \) level of significance if the \( P \)-value of the test is less than \( \alpha \) (set to 0.05). This test requires that the sample size in each stratum must be greater than unity. We used the Cochran-Mantel-Haenszel test to
determine whether there is conditional independence between either effectiveness of lockdown at farmers’ locations or farmers’ preparedness for current COVID-19 crisis and the impact of COVID-19 and lockdown policies on farm or business revenue.

3. Results

3.1 Characteristics of respondents

In total, 303 farmers responded to the survey, 64.02% of whom were from Ghana (Table 11.2). Most of the respondents were men, 91.24% and 77.98% from Ghana and Nigeria, respectively. The higher number of men than women might be attributed to the fact that men who are involved in agriculture are more educated than their female counterparts and thus have access to social media, which was the major channel through which the data for the study were collected. The same reason can also be offered to explain why respondents were mostly aged between 31 and 40 years: 51.55% in Ghana and 39.45% in Nigeria.

Fig. 11.2 presents the distribution of respondents in both Nigeria and Ghana based on some parameters, which include gender, age groups, status of lockdown, preparedness of respondents, and rating of impact of COVID-19 crisis on respondents’ farm or business revenue. It is observed from Fig. 11.2 that 86.5% of the total number of respondents are men while 13.5% are women and 67.1% of the total number of respondents are at most 40 years old. About 53.6% respondents’ farm locations are under lockdown policies, while there is no lockdown policy in 46.4% of the respondents’ farm locations. It is also observed that 65.5% of the respondents are not prepared for the COVID-19 crisis in their farm locations, while 34.5% claimed they are prepared for the crisis in their locations. Similarly, 82.6% of the respondents experienced at least the negative impact of COVID-19 crisis and lockdown policies in their farm or business revenue, while 8.9% of the respondents could not infer whether their farm or business revenue were positively or negatively affected by the COVID-19 crisis and lockdown policies.

Table 11.2 Summary statistics of farmers.

|                  | Ghana     | Nigeria   |
|------------------|-----------|-----------|
| **Gender**       |           |           |
| Women            | 17 (8.76) | 24 (22.02)|
| Men              | 177 (91.24) | 85 (77.98) |
| **Age group (years)** |         |           |
| <30              | 46 (23.71) | 15 (13.76) |
| 31–40            | 100 (51.55) | 43 (39.45) |
| 41–50            | 36 (18.56)  | 34 (31.19) |
| >50              | 12 (6.19)   | 17 (15.6)  |
| **Total**        | 194        | 109       |
3.2 Farmers’ rating of impact of COVID-19 and lockdown policies on their farm or business revenue

The ratings of the impact of COVID-19 and lockdown policies on respondents’ farm or business revenue based on age distribution of the respondents in the two countries are summarized in Fig. 11.3. More than 80% of respondents in each country were negatively or very negatively affected by COVID-19 and the lockdown policies, irrespective of the country. Very negatively affected respondents were relatively more common in Nigeria than in Ghana (Fig. 11.3). Interestingly, 4.2%–12% of respondents were positively to very positively impacted in both countries for all age groups. None of the respondents older than 50 years were positively to very positively impacted in Ghana. Many of the respondents in Nigeria and Ghana, across all ages and gender, were negatively affected by COVID-19 and lockdown policies. The negative effect was relatively more common in Nigeria than that in Ghana. Interestingly, a few respondents still had some positive impact of the situation on their business. A higher proportion of women were positively affected in Ghana than men. The chi-square test of independence shows that the ages of respondents do not influence the impact of COVID-19 and lockdown policies on respondents’ farm or business revenue (P-value = .475) in Nigeria. Similarly, no
association between these variables was detected in Ghana (\(P\)-value = .163). That is, the ages of the respondents and the opinions of the respondents in the two WA countries on the impact of COVID-19 and lockdown policies on respondents’ farm or business revenue are dependent on each other.

The ratings of the impact of COVID-19 and lockdown policies on respondents’ farm or business revenue based on the gender of the respondents in both countries are shown in Fig. 11.4. For both genders, most of the respondents were either negatively affected or very negatively affected in their farm or business revenue by COVID-19 and lockdown policies irrespective of their countries. However, there were more respondents from Nigeria who were very negatively affected than in Ghana.

The proportion of women who were positively affected in Ghana (17.65%) was higher than that of men (6.78). In Nigeria, the proportion of women positively or very positively affected (8.33%) was similar to that of men (9.42%). There is no relationship between the gender of respondents and the impact of COVID-19 and lockdown policies on respondents’ farm or business revenue (\(P\)-value = .104).

### 3.3 Impact of farmers’ preparedness for COVID-19 and lockdown on their farm or business revenue

The preparedness for COVID-19 and lockdown at respondents’ countries affects respondents’ farm or business revenue, as shown in Fig. 11.5. In Ghana, more than half of the respondents (65.98%) claimed that the current COVID-19 crisis was not well prepared for in their farm locations. Similar proportions in Nigeria (65.13%)
also claimed that the current COVID-19 crisis was not well prepared for in their farm. There was no relationship between the impact of COVID-19 and lockdown policies on respondents’ farm or business revenue and either of the gender of Nigerian respondents ($P$-value = .107) and the status of lockdown in Nigeria ($P$-value = .667).

**FIGURE 11.4** Rating of impact of COVID-19 and lockdown policies on respondents’ farm or business revenue based on gender of the respondents.

**FIGURE 11.5** Impact of preparedness for COVID-19 lockdown at respondents’ locations on the respondents’ farm or business revenue.
Similarly, in Ghana, no relationship was found between the impact of COVID-19 and lockdown policies on respondents’ farm or business revenue and the gender of Ghanaian respondents ($P$-value = .605).

### 3.4 Farmers’ rating of the impact of COVID-19 lockdown on their farm or business revenue in relationship to whether lockdown was implemented in their location

Fig. 11.6 shows farmers’ perceived impacts of COVID-19 national lockdown on their farm or business revenue in relation to whether lockdown was implemented in their location. The main idea here was to examine whether the impact of lockdown is felt in a similar way in locations where lockdown is implemented compared to locations where lockdown is not implemented. Irrespective of the country, proportions of farmers rating negative to very negative for the impacts of COVID-19 lockdown were similar in both locations where lockdown has been applied or not. Considering who rated the impacts as positive to very positive, not much difference was also observed in Ghana. Nevertheless, in Nigeria, we did not record any positive to very positive impact among farmers in the region where the lockdown was not applied. This is rather suggesting that being in the location where lockdown is applied or not does a priori affect the impacts of the lockdown on farmers’ activities.

We found no relationship between the impact of COVID-19 and lockdown policies on respondents’ farm or business revenue and the status of lockdown in Nigeria.
(P-value = .667). Similarly, in Ghana, no relationship was found between the impact of COVID-19 and lockdown policies on respondents’ farm or business revenue and the status of lockdown (P-value = .658).

Combined information from both Ghana and Nigeria shows that there is a relationship between the country where farms of each of the respondents is located and their views on the impact of COVID-19 and lockdown policies on respondents’ farm or business revenue (P-value = .008). This implies that countries of respondents are dependent on the opinions of the respondents on the impact of COVID-19 and lockdown policies on respondents’ farm or business revenue. The impact of COVID-19 and lockdown policies on respondents’ farm or business revenue does not depend on the status of lockdown (whether there is lockdown or not) at respondents’ locations (P-value = .161). Further findings show that the impact of COVID-19 and lockdown policies on respondents’ farm or business revenue depends on the level of preparedness of farmers to handle the situation with the current COVID-19 crisis in their farms (P-value = \(3.168 \times 10^{-5}\)). The impact of lockdown on respondents’ farm or business revenue was not as pronounced in the locations where it was implemented.

4. Discussion

The findings of our study showed that the respondents were mostly aged between 31 and 40 years; this is contrary to the general belief that the average age of farmers in WA is 55 years [16]. The high number of youth could be attributed to the recent involvement of youth in agriculture because of unemployment, insufficient white-collar jobs, and government/NGO incentives [17]. It can also be due to the fact that younger people have more access to social media, which is the major channel through which the data were collected during this study. Many of the respondents in both countries, across all ages and gender, were negatively affected by COVID-19 and the lockdown policies. On a general note, majority of the respondents claimed that the current COVID-19 crisis was not well prepared for in their farm and farming business. This is worrisome because it threatens food security in the region and aligns with the earlier prediction of food insecurity as a result of COVID-19 [12,13]. The study also revealed that being either in the location where lockdown is applied or not does not affect the impact of the lockdown on their activities. The negative effect of COVID-19 was relatively more common in Nigeria than in Ghana. Interestingly, a few respondents still had some positive impact of the situation on their business. A higher proportion of women were positively affected in Ghana than men. The fact that none of the older farmers (older than 50 years) were positively impacted in Ghana might be attributed to inadequate awareness of COVID-19 among this group of farmers, that planting season has just begun in WA, or that due to their relatively old age, they are relatively less involved in agricultural activities and consequently did not feel the impacts of the epidemic as the other respondents.
Gender inequality is a major setback to the development and productivity of agriculture. Generally, the impact of COVID-19 with respect to gender in this study revealed that most respondents were either negatively or very negatively affected. Ghanaians were mostly affected negatively, while most Nigerians were very negatively affected. The negative impact among Ghanaians and Nigerians was higher in men than in women. A higher proportion of women in Nigeria were very negatively affected by COVID-19 than men; this was quite similar for both men and women in Ghana. In Ghana and Nigeria, agriculture (farming) and its related activities are highly gendered, mostly dominated and controlled by men [18–22], partly due to culture and gender recognition. Wilbers [18] reported that the patrilineal inheritance in Ghana limits women’s access to land acquisition and control of farm produce. Ogunlela and Mukhtar [21] stated that in Nigeria, women constitute a larger (60%–80%) share of the agriculture labor force but have limited access to land, inputs, labor, and extension services. It must be noted that both men and women make significant contributions to agriculture and its related activities needed to ensure food security of the family. In this study, a higher proportion of women than men were positively affected by COVID-19 in Ghana. Also in Nigeria, a higher proportion of women than men were very positively affected. These findings suggest that women in agriculture and its related activities have better adaptative strategies to pandemics than men in the same. It has been indicated that in most rural communities in sub-Saharan Africa, the roles of women, especially in agriculture and rural economy, cannot be overemphasized [20]. Their roles range from producing, trading, and processing of crops and animals and maintaining and caring for their homes and family members, among others. Despite this, women have no or limited role to play in decision-making processes regarding agriculture development [21]. Howbeit, recognizing the role of women in agriculture is very important in promoting food security and resilience agriculture to combat future pandemics, especially in the food supply chain. Furthermore, older people, especially smallholder farmers, might be more vulnerable to the impact of lockdown policies because their farming activities are mostly oriented toward subsistence and any disruption might have important negative feedback on their activities [23]. Our study indicated rather no significant differences across age categories with respect to the impacts of COVID-19 and lockdown policies on their farm or business revenue. Further analyses should consider the agricultural sector in which the respondents are operating and the size of their exploitation (small, medium, or large) to provide better insights of the epidemic impacts.

It is not strange that the novel coronavirus pandemic (COVID-19) negatively affected the farmers in the countries of the study, and this was not actually prepared for. Evidence of this is seen in the rise in the cost of some food items across WA. Similar reports were reported [13,14]. A study [24] across some Asian countries reveals the same trend. Some of the negative impacts of the pandemic and the consequence of the lockdown policies include disruption of agricultural activities and supply chains, produce distribution issues, change in domestic demand, and stoppage of night farmers’ markets. It was envisaged that the agricultural community will face acute shortage of
inputs such as fertilizer, seed, feed, and pesticides if the pandemic continues for an extended period. This will affect the replenishment of food stocks in exporting countries and on local farms. Invariably, potential shortages of labor for farming and food processing due to measures to limit the spread of the virus may occur [24]. This calls for attention not only in WA but also all over the world. Some efforts have been exerted in this regard [25,26]. One such effort is that of the United Nations [25] entities working closely with national governments, community groups, the health sector, and the health industry to respond to the crisis of strains placed on health systems, essential public services, and communities globally by the pandemic. Another significant response, especially focused on gender-sensitive response to the negative impact of COVID-19 on agriculture and food security, is the effort by the International Food Policy Research Institute to involve researchers and professionals in a virtual discussion [27]. Some of the response efforts suggested by Hossain [24] include recommendation of group purchases and farmers’ markets. This is expected to assist farmers and grain producers to promote diversified products, improve the efficiency of transportation, and lengthen the shelf-life of vegetables and fruits.

5. Conclusion and recommendations

This study is one of the first to address COVID-19 impact on farmers in WA based on information provided directly by farmers themselves. Our findings show that COVID-19 and the lockdown policies have a negative impact on most of the respondents’ farm or business revenue. The impact is independent of either age or gender of respondents and the effectiveness of lockdown in Nigeria. Similarly, in Ghana, the impact of COVID-19 and lockdown policies on farm or business revenue is independent of age and gender of respondents and the effectiveness of lockdown. Also the status of lockdown and the level of preparedness of farmers to handle the situation with the current COVID-19 crisis in their farms is independent in Nigeria and Ghana. Finally, the impact of COVID-19 and lockdown policies on respondents’ farm or business revenue mostly depends on the level of preparedness of farmers to handle the situation with the current COVID-19 crisis in their farms.

Based on this study and its findings, we recommend that agricultural activities should be seen as essential services. Farmers and security agents should be enlightened about this fact. Farmers and agro-allied workers should be given movement pass during lockdowns. COVID-19 has become a global issue requiring coordinated regional and global responses. It is very important that policies and initiatives that support essential businesses including agriculture and agri-food businesses should be put in place to ensure that the local, regional, national, and international supply chains are not broken. Further analyses will consider the specific agricultural sectors with respect to their size for better insights into the impact of the epidemic.
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