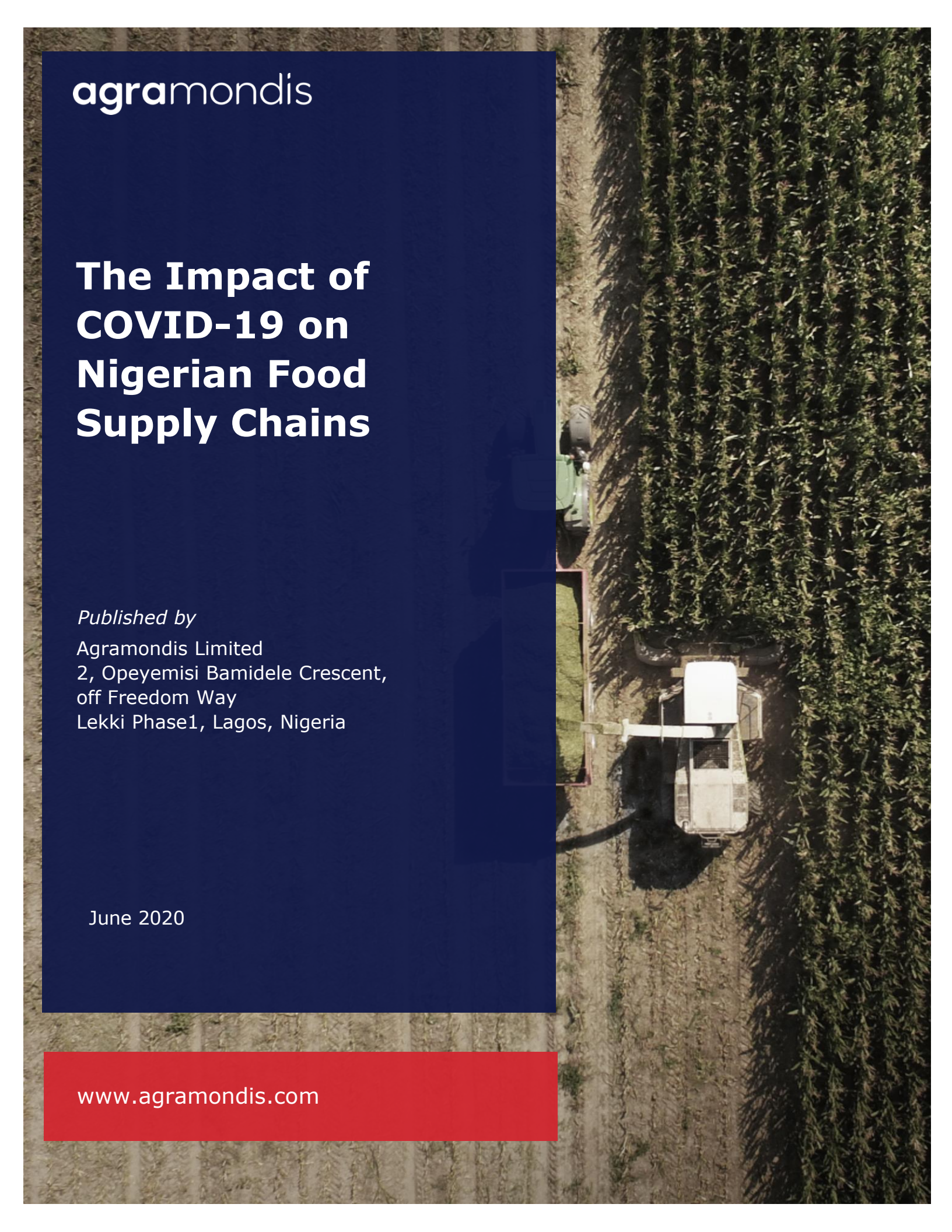




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The Impact of COVID-19 on Nigerian Food Supply Chains

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1. Introduction

Since the outbreak of the COVID-19 virus, people around the world have been raising concerns about the impact of COVID-19 on the global economy as well as on food production, food supply and agricultural value chains. The COVID-19 pandemic is a global challenge which is not peculiar to Nigeria alone and it has posed a threat not only to human health but also to the global economy. Among the questions people are asking, especially agricultural experts, is how the pandemic is affecting Nigerian food supply chains and food security in Nigeria.

In Nigeria, much attention has been on the medical and public health sector, while lesser attention has been given to the agricultural sector during this pandemic period even though agriculture is essential and necessary for good health. For example, the Private Sector Coalition Against COVID-19 (CACOVID) alone has reportedly amassed over NGN21 billion in donations towards the implementation of a coordinated response to the COVID-19 pandemic in Nigeria and the figures keep increasing¹. Also, the European Union (EU) announced the contribution of EUR 50 million (NGN21 billion) for the prevention and mitigation of COVID-19 in Nigeria² while the contributions from both the federal and state governments are constantly being reviewed as the virus continues to spread. For example, the establishment of a NGN500 billion COVID-19 Crisis Intervention Fund by the federal government as well as NGN102.5 billion in resources that was made for direct interventions in the healthcare sector³. All these efforts are aimed at ensuring optimum care for the confirmed cases of the COVID-19 as well as curtailing further spread in Nigeria.

Notwithstanding government efforts to support the agriculture sector during this COVID-19 pandemic, much attention remains on the health sector. The challenge with focusing more on the health sector with lesser attention on the agriculture sector, is that if the food supply chain is not properly managed during and after

¹ "CACOVID: Nigeria's private-sector response to COVID-19" 15 Apr. 2020, <https://businessday.ng/coronavirus/article/cacovid-nigerias-private-sector-response-to-covid-19/>

² "EU Boosts Nigeria's COVID-19 Response with N21 Billion" 14 Apr. 2020, https://eeas.europa.eu/delegations/nigeria/77571/eu-boosts-nigeria%E2%80%99s-covid-19-response-n21-billion-contribution_en

³ "Covid-19: Federal Government of Nigeria announces fiscal" 6 Apr. 2020, https://pwc nigeria.typepad.com/tax_matters_nigeria/2020/04/covid-19-federal-government-of-nigeria-announces-fiscal-stimulus-measures.html

COVID-19, the Nigerian food supply chain could be severely compromised. The disruptions such as movement restrictions, social distancing, partial or complete closure of borders, among others, caused by the pandemic could lead to a further food crisis in Nigeria as there is already food insecurity in some parts of the country. As indicated in the Cadre Harmonisé analysis, there were about 2.6 million people who faced severe food insecurity in Adamawa, Borno and Yobe states in Nigeria as at November 2019⁴. Also, the Food and Agriculture Organization (FAO) had predicted that between June and August 2020 about 7 million

“The Food and Agriculture Organization (FAO) had predicted, *pre-COVID-19*, that between June and August 2020 about 7 million Nigerians will experience food shortage in 16 northern states and Abuja.”

Nigerians will experience food shortage in 16 northern states and Abuja⁵. In order to avert the looming food crisis in Nigeria and ensure food security, it is necessary to give attention to policies and stimulus packages for the agricultural value chain actors who are also on the frontline of COVID-19 in ensuring food security. Thus, the agriculture sector need not to be neglected

for any other sector at this moment as it was when crude oil was discovered in Nigeria.

This report takes a deep dive into:

1. The pre-existing challenges in the agricultural sector in Nigeria, looking at each segment of the agricultural value chains to underscore their vulnerabilities.
2. The impacts of other previous epidemics and pandemics on food production in Africa and Nigeria.
3. The food security situation in Nigeria and the various stimulus packages in place to help avert a looming food crisis as a result of the pandemic.

⁴ "Nigeria : FAO in Emergencies - Food and Agriculture" <http://www.fao.org/emergencies/countries/detail/en/c/213439>

⁵ "7 million Nigerians, 13 states to experience food shortage- FAO." 20 Mar. 2020, <https://nairametrics.com/2020/03/20/7-million-nigerians-to-experience-food-shortage/>

4. The food supply chains in Nigeria prior to COVID-19, digging deeper into the impact of the pandemic on food supply chains during the spread of COVID-19, while looking at the outlook of food supply chains in the post COVID-19.
5. Actionable recommendations on the sustainability of Nigerian food supply chains in the medium and long-term.

2. Overview of the Agriculture Sector in Nigeria

Prior to the discovery of crude oil in Nigeria in 1956 at Oloibiri in the Niger Delta, agriculture was the mainstay of the Nigerian economy, contributing an average of 57% of GDP and generating 64.5% of export earnings between 1960 to 1969 to the economy⁶. However, because of the oil boom of the 1970s the Nigerian government channelled its focus to the petroleum sector which has led to the steady decline in the agricultural sector's contribution to the Nigerian GDP and

“The Nigerian government’s attention on the petroleum sector at the expense of the agricultural sector has cost the country valuable export opportunities, as well as exacerbated the food security challenges.”

export earnings. Between 2010 to 2018 the agriculture sector contributed an average of 27.7%⁷ to the Nigerian economy compared to 57% in the 1960s. This is an indication of the neglect which the agriculture sector has faced because of the government's focus on the petroleum sector thereby driving the economy into a mono-economy. FAO estimates that Nigeria lost about USD 10 billion annually from export opportunity from groundnut, palm oil, cocoa and cotton as a result of the continuous decline in the production of these commodities in Nigeria as the government continues to focus more attention on the petroleum sector⁸. The Nigerian government's attention on the petroleum sector at the expense of the agricultural

⁶ "Transforming Nigeria's agricultural value chain - PwC." <https://www.pwc.com/ng/en/publications/transforming-nigeria-s-agricultural-value-chain.html>

⁷ "NATIONAL BUREAU OF STATISTICS." <https://www.nigerianstat.gov.ng/>

⁸ "Nigeria at a glance | FAO in Nigeria | Food and Agriculture" <http://www.fao.org/nigeria/fao-in-nigeria/nigeria-at-a-glance/en/>

sector has cost the country valuable export opportunities, as well as exacerbated the food security challenges.

Despite the concentration on the petroleum sector, agriculture remains the base and the largest single sector of the Nigerian economy and employed about 35%⁹ of the Nigerian labour force in 2019. However, the sector is still confronted with many challenges combined with poor government attention to the sector which has kept agricultural productivity low with high post-harvest losses and waste in Nigeria. As the price of crude oil continues to plummet as a result of the impact of the COVID-19 pandemic on the global economy, Nigeria that depend primarily on the petroleum sector, is already experiencing a downward turn in the demand for crude oil in the international market and creating a negative impact on the economy. For example, the federal government has made a revision to the 2020 budget to accommodate changes in the benchmark crude oil price, which has dropped down to as low as \$25¹⁰ per barrel price from the \$57 per barrel price estimate¹¹. **What is the implication of the 56% decrease in the price per barrel of crude oil for the Nigerian economy and the agriculture sector?** This means that the agricultural stakeholders in Nigeria, including the federal and state governments as well as the private sector, can no longer delay the urgent need to rejigger the sector. This will help to develop and improve the food supply chains in Nigeria during and after the COVID-19 pandemic, reduce the rising food security concerns and enable the sector to further contribute to Nigeria's economic growth and development.

3. Pre-existing Agricultural Vulnerabilities in Nigeria

Despite the importance of the agriculture sector to the Nigerian economy for decades, the contribution of the sector to the overall Nigerian GDP continued to decline as a result of the government shift of focus to the petroleum sector which has led to many challenges besetting the sector. **The Nigerian agricultural sector is confronted with many challenges such as an outdated land tenure system which hinders access to land, a low level of irrigation development, poor adoption of**

⁹ "Employment in agriculture (% of total" <https://data.worldbank.org/indicator/SL.AGR.EMPL.ZS>

¹⁰ "Daily Crude Oil Price | Up to - Central Bank of Nigeria." <https://www.cbn.gov.ng/rates/DailyCrude.asp>

¹¹ "COVID-19: Economic, tax and other fiscal stimulus measures"

<https://www2.deloitte.com/ng/en/pages/tax/articles/COVID-19-economic-tax-other-fiscal-stimulus-measures-in-nigeria.html>

research findings and technologies, high and unstable cost of farm inputs, inadequate access to credit, inefficient fertilizer procurement and distribution, inadequate storage facilities and poor access to input and final markets. Also, other factors limiting agricultural production and development in Nigeria include reliance on rainfed agriculture, smallholder landholding, and low productivity due to poor planting material, low fertilizer application, and a weak agricultural extension system amongst others¹². **Smallholder farmers who account for about 88%¹³ of Nigeria's farmers and produce about 99%¹⁴ of Nigeria's agricultural outputs are the most vulnerable players along the agricultural value chains that are most bedevilled with these challenges.** Further, the COVID-19 pandemic has exacerbated these pre-existing challenges in the Nigerian agricultural value chains. In this section, we review some of these vulnerabilities in general.



¹² "Nigeria at a glance | FAO in Nigeria | Food and Agriculture" <http://www.fao.org/nigeria/fao-in-nigeria/nigeria-at-a-glance/en/>

¹³ "Nigeria - FAO." <http://www.fao.org/3/i9930EN/i9930en.pdf>

¹⁴ "National survey and segmentation of smallholder households" 1 Jun. 2017, <http://documents.worldbank.org/curated/en/316661513583254475/National-survey-and-segmentation-of-smallholder-households-in-Nigeria-understanding-their-demand-for-financial-agricultural-and-digital-solutions>

3.1 *Low access to input supply*

The inadequate supply of inputs has affected agricultural production in Nigeria over the years. The seedlings, fertilizers and water needed for production are lacking for local farmers. **High expenses for agricultural inputs, estimated at about 20% of the value of production, hinder productivity of smallholder farmers even further¹⁵.** In addition, the land-securing process is time-consuming and expensive and discourages farming. Thus, input supply is a critical factor in inclusive agricultural and rural development in Nigeria. Therefore, many donors and both the federal and state governments support initiatives that will improve the access of smallholder farmers to quality inputs such as improved seeds, fertilizers and pesticides, irrigation facilities and crop protection services, among others¹⁶.

3.2 *Production challenges*

Farmers in most states in Nigeria adopt about 70-90% of hand-tools technologies, 10-25% adopt draught animal power while only 5-15% adopt mechanical power for agricultural production in Nigeria¹⁷. Many farmers in Nigeria lack the resources to acquire agricultural modern machineries like tractors and ploughs for crop production. **In Nigeria, the rate of mechanization, which is about 0.021 hp/ha, is very low compared to the 1.5hp/ha recommended by FAO¹⁸.** The effect of over dependence on hand-tools technologies in Nigeria results in low crop productivity. There are many constraints that have hindered the success of farm mechanization in Nigeria including fragmentation of farmlands, poor access to credit, scarcity of farm machinery and equipment, insufficient farm inputs, poor infrastructural facilities, land degradation, poor social and economic structures among others¹⁹. The slow adoption of mechanization in Nigeria has reduced the quality of agricultural products considerably. Thus, reduced accessibility to modern

¹⁵ "Nigeria - FAO." <http://www.fao.org/3/I9930EN/i9930en.pdf>

¹⁶ "Nigeria Agro Inputs Dealers speaks on farm inputs and" <https://africanharvesters.com/2017/08/02/nigeria-agro-inputs-dealers-speaks-farm-inputs-productivity/>

¹⁷ "MECHANIZATION IN NIGERIA: YESTERDAY, TODAY AND" <https://iart.gov.ng/wp-content/uploads/2017/04/REFILS-KEYNOTE-ADDRESS.pdf>

¹⁸ "MECHANIZATION IN NIGERIA: YESTERDAY, TODAY AND" <https://iart.gov.ng/wp-content/uploads/2017/04/REFILS-KEYNOTE-ADDRESS.pdf>

¹⁹ "A Study of Status, Challenges and Prospects of Agricultural" http://watchpub.org/jeah/issues/2013/may/pdf/Akande_and_Lamidi.pdf

farming equipment and limited availability of trained workers have kept down the rate of mechanization.

3.3 Limited storage facilities

Inadequate agricultural storage facilities in Nigeria has resulted in high post-harvest losses, poor food quality and undersupply of agricultural products, all these have continued to threaten the Nigerian food security. The increase in post-harvest losses of farm produce remains a challenge to Nigerian farmers due to inadequate storage facilities. **Experts hinted that Nigeria farmers' post-harvest loss rate in 2017 was up to 60% for perishable crops due to lack of modern storage facilities and inadequate storage capacity²⁰.**

3.4 Lack of processing capacity

The Nigerian agro-processing landscape is underdeveloped due to many factors, such as poor integration of agriculture with markets, lack of technological know-how by SME agro-industrialists, inadequate investment in equipment and poor storage systems. For post-harvest loss reduction, the processing of agricultural products is important. Policy intervention to increase agro-processing will no doubt, prove revolutionary for the country. **In Nigeria, the**



²⁰ "ADVERTORIAL: Improved storage facilities for enhanced" 25 Sep. 2017, <https://www.africannewspage.net/2017/09/advertorial-improved-storage-facilities-enhanced-agricultural-productivity-nigeria/>

average value of post-harvest losses for fruits and vegetables is between 35-50% of total production while the level of loss for grains is about 15-25%²¹. These high levels of losses are disincentives for production increase by farmers and ultimately deny farmers the needed revenue to facilitate expansion of their farms.

3.5 Weak infrastructure and quality challenges for international exports

High transport cost, bad roads, and long distances from farms to the market provide a negative impact on the marketing of agricultural products, as revealed in a study conducted in Kwara state²². **The poor roads and network connectivity, inadequate business knowledge to recognize domestic and external prospects, and lack of logistics infrastructure are problems associated with agriculture in most states in Nigeria.** From an international trade perspective, some Nigerian agricultural commodities, like yam, when subjected to international standard requirements often fail to meet the set standards due to poor production quality and low packaging standards, among others. **For example, there was a rejection of about 67% of processed and semi-processed food products from Nigeria in the international market in 2016 and 2017**²³. These food products include; brown and white beans, melon seeds, palm oil, mushrooms, bitter leaf, pumpkin leaves, shelled groundnut, smoked catfish, and crayfish.

3.6 Lack of access to finance

Nigeria's agricultural sector is grossly underfunded. **The federal government's budgetary allocation in 2018 for agriculture was NGN0.20 trillion, representing 2.2% of the total budget of NGN9.12 trillion**²⁴. This is compared to the 25% and 10% prescribed by the FAO and the African Union (AU)

²¹ "Agro-Processing To Drive Nigeria's New Economy" 3 Jul. 2015, <https://economicconfidential.com/2015/07/agro-processing-to-drive-nigerias-new-economy/>

²² "(PDF) Impact of Rural road transport on Agricultural" 17 Jan. 2018, https://www.researchgate.net/publication/322539665_Impact_of_Rural_road_transport_on_Agricultural_Product_ion_in_Kwara_State

²³ "Nigerian commodities facing lengthy global rejection amid" 30 Apr. 2018, <https://www.businessamlive.com/nigerian-commodities-facing-lengthy-global-rejection-amid-poor-production-conditions/>

²⁴ "Evaluating Agriculture Finance in Nigeria - PwC." <https://www.pwc.com/ng/en/assets/pdf/evaluating-agric-finance-nigeria.pdf>

respectively²⁵. Also, the ratio of total bank credit to the agricultural sector was 3.26% and 3.36% of total credit to the private sector in 2016 and 2017 respectively. This is despite being the largest single sector that contributes more to Nigerian GDP compared to other industries²⁶. Agricultural production requires long-term and sustainable financing in all segments of the value chain. Over the years, many funding initiatives in the sector have been supported by the government. Nevertheless, the viability of the intervention schemes and farmers' accessibility have been major constraints to rising credit growth for the agricultural sector.

4. Farming and Harvesting in Nigeria amidst COVID-19

According to World Bank in 2019, 35% of the total employment in Nigeria was in the agriculture sector²⁷, this made the sector the largest employer of labour force among other sectors in the country. Nigeria is blessed with agricultural resources, a large expanse of land estimated at 91 million hectares of which 81 million hectares are arable and 18 million hectares of land classified as permanent pasture, for livestock production²⁸. Agriculture has its place in the history of the nation, this is the reason for the 'green' in the Nigerian flag, and the progressive roles it has played, serving as the major source of livelihood of the population.

“Agriculture has its place in the history of the nation, this is the reason for the 'green' in the Nigerian flag, and the progressive roles it has played, serving as the major source of livelihood of the population.”

In agricultural markets, any effects to rural household health and livelihoods may impact production directly, decreasing planting and harvesting²⁹. With a kind of pandemic like COVID-19, farmers will have to cope with movement restrictions and

²⁵ "Experts say Nigeria's agric not sustainable due to gross" 29 Sep. 2016, <https://businessday.ng/agriculture/article/experts-say-nigerias-agriculture-sector-not-sustainable-due-to-gross-underfunding/>

²⁶ "Evaluating Agriculture Finance in Nigeria - PwC." <https://www.pwc.com/ng/en/assets/pdf/evaluating-agric-finance-nigeria.pdf>

²⁷ "Employment in agriculture (% of total" <https://data.worldbank.org/indicator/SL.AGR.EMPL.ZS>

²⁸ "History of agriculture in Nigeria | Agriculture Nigeria." 23 Sep. 2013, <https://www.agriculturenigeria.com/research/history-of-agriculture-in-nigeria/>

²⁹ "Introducing the COVID-19 Emergency Briefing Series" 14 Apr. 2020, <https://www.rafllearning.org/post/introducing-the-covid-19-emergency-briefing-series>

paralyzed supply chains. That is, the transport restrictions and quarantine measures are likely to impede farmer's access to markets, curbing their productive capacities and hindering them from selling their produce. In addition, farmers might be hindered from working on their land and buying seeds or other essential inputs. An example of this situation occurred in January when Chinese Poultry farmers reported that they were "very distressed" due to lack of access to feed inputs. The shortages of labour could disrupt the production and processing of food, especially for crops that are highly labour-intensive such as palm oil and cottonseed oil.



Since the COVID-19 pandemic, countries around the world have taken different measures to curtail the spread of the virus ranging from movement restrictions, social distancing to partial or complete closure of borders. Social distancing and border closures will impact production and transportation, while changes in spending power of consumers will impact demand.

Market linkages are particularly at risk, as food systems adapt to different ways of working and demand patterns.

Limited access to inputs

due to decreased distribution and financing will affect yields of future harvest cycles, even after the immediate risk of the virus has passed. Most of these measures have a significant impact on the availability of farmworkers (especially seasonal migrant workers). Findings have shown that labour migration has been one of the essential components that facilitates regional integration and economic development in Africa. Migrant workers create supplementary employment opportunities for native-born workers and thus reduce unemployment rates³⁰. The study carried out by AgroNigeria on “the impact of COVID-19 on migrant farmers” further disclosed that the inputs of these migrant workers contribute to the development of the formal sector of the economy and thereby resulting in a positive effect of public finance.³¹

In Nigeria, the migrant farmers constitute more than 50-60% of the workers that make agriculturists in southern Nigeria.³² This has made the agriculture sector rely heavily on the labour force of the migrants from neighbouring countries that share land borders, such as the Republic of Benin in the west, Chad and Cameroon in the east, and the Republic of Niger in the north. **However, the impact of COVID-19, which restricts movement, is unfortunately happening between the season when farming is gradually beginning to pick up.** For example, in southern Nigeria the planting of maize and yams started in early March 2020³³. **The restriction of movement, including the migrant seasonal workers, will have a negative impact on the food production particularly for smallholder farmers and labour-intensive crops such as palm oil and cottonseed oil.** Further, agricultural experts emphasized that any form of obstruction in the production and distribution of seeds, fertilisers, herbicides, and other agro-chemicals would adversely impact farming activities in this planting season, which has already started³⁴.

³⁰ "How Immigrants Contribute to Developing Countries ... - ILO." https://www.ilo.org/wcmsp5/groups/public/---ed_protect/---protrav/---migrant/documents/publication/wcms_616038.pdf

³¹ "How Immigrants Contribute to Developing Countries ... - ILO." https://www.ilo.org/wcmsp5/groups/public/---ed_protect/---protrav/---migrant/documents/publication/wcms_616038.pdf

³² "The Impact of Covid-19 on Migrant Farmers – AgroNigeria." 1 May. 2020, <https://agronigeria.ng/2020/05/01/the-impact-of-covid-19-on-migrant-farmers/>

³³ "FAO GIEWS Country Brief on Nigeria -." <http://www.fao.org/giews/countrybrief/country.jsp?code=NGA>

³⁴ "Farmers say lockdown hampering essential inputs supply" 3 Apr. 2020, <https://businessday.ng/exclusives/article/farmers-say-lockdown-hampering-essential-inputs-supply/>

Akintunde Sawyerr, Founder of the Agricultural Fresh Produce Growers and Exporters Association of Nigeria (AFGEAN) joined CNBC Africa for a discussion on **how to ensure food security in Nigeria during the COVID-19 times and these were the key takeaways**³⁵:

1. Farmers complain of not wanting to harvest their produce as there is no one to come and buy their produce because of the lockdown.
2. There is difficulty getting aggregators to buy at the farm gate thus leading to spoilage of some goods especially the perishable ones therefore, leading to loss for the farmers.
3. If they cannot get anyone to sell to, there is no motivation to plant and that means there is a looming food shortage crisis.

FAO has called on the Nigerian Government and private entities to create and prioritize plausible incentives and funding for farmers across the country. The food agency noted that this was significant in ensuring an increase in agricultural output and diversifying the production of high-quality foods. A webinar held May 8, 2020 by the Lagos Business School (LBS) in partnership with Bank of Agriculture (BOA), Bank of Industry (BOI), Nigeria Incentive-Based Risk Sharing System for Agricultural Lending (NIRSAL) and Federal Ministry of Agriculture and Rural Development (FMARD) has shown that **a lot is being done by both the government and the private sector to combat the looming food crisis, such as:**

- Ongoing initiatives by the BOI (Bank of Industry) to provide palliatives to farmers, reduce interest rates, and provide logistics to ensure continuous flow and reduce post-harvest losses.
- Working to ensure credit facilities are available to all players in the value chain.
- Reduced price of inputs that are being given to the farmers. It is important to note that BOI does not deal directly with primary farmers but with food processors, aggregators, and manufacturers who in turn deal directly with farmers to provide all they need.

Also, it was discussed that farmers are embracing new policies and opportunities and there is hope for a drastic change in yield. **Going forward, agriculture is Nigeria's**

³⁵ "How Nigeria can ensure food security during the COVID-19" 24 Apr. 2020, <https://www.cnbc africa.com/videos/2020/04/24/how-nigeria-can-ensure-food-security-during-the-covid-19-lock-down/>

veritable tool to recover from any looming economic crisis. It is therefore expected that:

- Future policies should support the current situation of the country and every key player be put into consideration.
- Nigerians (government and the private sector alike) look inward for homegrown solutions post COVID-19 that would be sustainable.
- Since it's no news that agribusiness is the next gold mine, more Nigerians should venture into it to boost production of goods and services more efficiently.
- Every gap identified should be taken advantage of by people in the private sector and not necessarily wait for the government to do it.
- Agtech companies also play an important role as there is a need to introduce technology so that it is clear where demand is high and low, and needs can be met accordingly.

5. Support Services for Farmers and Agribusinesses in Nigeria

Alarmed with the already existing challenges in the food supply chain which have led to postharvest losses and wastes in Nigeria, efforts have since been mounted towards sustaining the fragile food supply chain before COVID-19 pandemic. However, further attempts are being made to curtail the adverse impact of the pandemic on Nigerian food supply chains during and after the COVID-19 pandemic.

Stimulus packages for Nigerian farmers as agribusinesses pre-COVID-19 may help ease the effects of COVID-19.

Prior to the COVID-19 pandemic, the Nigerian government has introduced different policies and stimulus packages for farmers and agribusinesses such as CBN intervention funds e.g. Commercial Agricultural Credit Scheme Funds (CACS); Micro, Small, Medium Enterprises Development Fund (MSMEDF), Agri-Business/Small and Medium Enterprise Investment Scheme (AGSMEIS) as well as Agricultural Productivity Enhancement and Livelihood Improvement Support (APPEALS), distribution of fertilizer and quality seeds to farmers, among others. **However, many**

factors have hindered the successful implementation of these policies, preventing the policies from achieving the desired set out goals. These factors include lack of (federal/state) government coordination, inconsistencies in policy, regulation, taxes and administrative practices, lack of security of raw material supplies to food processors, and inadequate access to market information, among others. All these factors have impacted agricultural production in Nigeria negatively and have contributed to the increased importation of food from other countries, while most of these imported foods can be produced in Nigeria. As the pandemic persists, All Farmers Association of Nigeria (AFAN) has further reinforced its demands for palliative for farmers from both federal and state governments on agricultural inputs including quality seeds, fertilizers, access to finance, soft loans, extension services, mechanization and technology³⁶. These agricultural stimulus packages being introduced around the world and in Nigeria to cushion the effect of the pandemic will help to increase food production and avert the looming food crisis in Nigeria as well as the world in general.

Alternative payment channels are increasing to help slow the spread of COVID-19.

CBN and other financial institutions in Nigeria are urging the general public both urban and rural dwellers to limit the use of cash and avail themselves of the use of alternative payment channels such as mobile banking, internet banking, mobile money, point of sale, and USSD to reduce the spread of COVID-19. In countries like Kenya, mobile money has helped in digitizing minor transactions both in the rural and urban centres compared to Nigeria where cash transaction is dominant. The Fintechs who have agents operating in the urban centres and rural areas are not left out as they have made efforts to encourage the public to make use of alternative payment channels to facilitate transactions. For example [Paga](#) has made fee adjustments to allow merchants to accept payments from Paga customers for free³⁷. While [PalmPay](#) has finalized plans to waive transfer fees in Nigeria and offer direct pay-outs to customers who have contracted COVID-19 in

³⁶ "COVID-19: Farmers demand palliative on farm inputs, soft" 13 Apr. 2020, <https://www.vanguardngr.com/2020/04/COVID-19-farmers-demand-palliative-on-farm-inputs-soft-loans-for-2020-farming-season/>

³⁷ "Africans using mobile payments to curb COVID-19 | Nairametrics." 26 Mar. 2020, <https://nairametrics.com/2020/03/26/africans-using-mobile-payments-to-curb-COVID-19/>

West Africa countries³⁸. All these aimed to help slow the spread of COVID-19 by reducing cash handling in Nigeria in the urban centres as well as in the rural areas which are dominated by smallholder farmers who mainly depend on cash transactions. **This will further increase the rate of financial inclusion of smallholder farmers and facilitate transactions along the food supply chain in Nigeria.**

Nigeria executes Targeted Credit Facility (TCF) and market fertilizer market prices, plus examples from other countries.

As the COVID-19 pandemic continues to threaten the world, governments of different countries are setting aside stimulus packages for their agricultural sector to prevent a food crisis during and after the pandemic. On March 17, 2020, a new decree was introduced by the Italian government, namely "Cura Italia" to allocate funds and provide incentives for agriculture, among other sectors. The decree allocates 100 million euro to support agricultural enterprises related to farming, fishery, and aquaculture to cover the interests of loans and mortgages. Similarly, the Chinese government introduced a series of "vegetable basket" policies to stabilize production and supply to reduce the impact of the epidemic on the purchase and sale of agricultural products to small farmers³⁹. In South Africa, the government announced a \$67 million stimulus package to support small scale farmers growing vegetables, fruits, poultry, and other significant crops, with priority given to women and persons with disabilities. The government also set up an end-to-end value chain tracker to monitor food availability across the country so that supply can be redirected to areas with extreme cases of food insecurity⁴⁰. **While in Nigeria, as part of palliative measures for farmers, the federal government in response to the COVID-19 crisis reduced the market price of PFI NPK 20.10.10 fertilizer to farmers and other end-users with about 10% for a per 50kg bag⁴¹.**

³⁸ "In Nigeria PalmPay waives fees and creates ₦100M COVID" 22 Apr. 2020, <https://techcrunch.com/2020/04/22/in-nigeria-palmpay-waives-fees-and-creates-%E2%82%A6100m-COVID-19-payout-fund/>

³⁹ "Coronavirus: food supply chain under strain. What to do? - FAO." 24 Mar. 2020, <http://www.fao.org/3/ca8308en/ca8308en.pdf>

⁴⁰ "African governments mobilize to keep people fed during" 9 Apr. 2020, <https://allianceforscience.cornell.edu/blog/2020/04/african-governments-mobilize-to-keep-people-fed-during-COVID-19-lockdowns/>

⁴¹ "COVID-19: FG cuts price of fertiliser as palliative for farmers" <https://www.sunnewsonline.com/COVID-19-fg-cuts-price-of-fertiliser-as-palliative-for-farmers/>



Also, the Nigerian government through the CBN introduced the NGN50 billion Targeted Credit Facility (TCF) as a stimulus package to support households and micro, small and medium enterprises (MSMEs) affected by the pandemic to cushion the economic impact of COVID-19⁴². Though, TCF is not specifically directed at the agriculture sector but the agricultural value chain activities are eligible to benefit from the scheme.

Some Africa countries are taking the approach of ensuring food security in the short term by introducing different stimulus packages mainly for the vulnerable population. In Ghana, the government has embarked on a \$40 million effort to distribute dry food packages and hot meals to more than 400,000 vulnerable individuals in areas that have been affected by lockdown and another \$40 million allocated to the Ghana National Buffer Stock Co., an agency under the Ministry of Agriculture that buys food and releases it into the system when there are shortages and price hikes. In Rwanda, the government has authorized food relief from the country's National Strategic Grain Reserve for vulnerable people who cannot buy food because they are not working due to the lockdown, while in Kenya, the government has also begun buying up surplus food from different counties to distribute to areas with vulnerable people. The Kenyan government plans to import two million bags of white maize for human consumption and an additional two million bags of yellow maize to be processed as

⁴² "N50 billion Targeted Credit Facility - Central Bank of Nigeria."
<https://www.cbn.gov.ng/Out/2020/FPRD/N50%20Billion%20Combined.pdf>

animal feed⁴³. **The Nigerian government is not left out as it is set to deliver up to 70,000 tons of grains from its reserve to cushion the effects of food shortages in Nigeria because of the COVID-19 pandemic⁴⁴.**

Will pre-existing measures and new measures tackle the effects of COVID-19 in the medium and long-term?

These temporary measures on food security being implemented by Africa countries will however not be sustainable in the medium term or long term. **If the COVID-19 pandemic continues to spread with stricter movement restrictions, and other problems such as compounded restricted access to farm inputs, quality seeds, chemicals, and machinery, it will impact food security in the longer-term.** This has already started playing out in Kenya, where farmers have faced delays in planting due both to lockdowns and a shortage of farm inputs⁴⁵.

The Nigerian government and development partners have continuously made efforts to support farmers and agribusinesses, but these have not led to the development of sophisticated and well-functioning food supply chains in Nigeria that can withstand shocks such as the COVID-19. During and beyond this pandemic period, support services will be further required from the private sector, government, and development partners to assist the actors in Nigeria to develop a resilient food supply chain. All the support services will need to be applied judiciously throughout the food supply chain depending on the identified gaps in each of the segments to ensure food security and avert potential food crisis in Nigeria.

6. Food Supply Chains in Nigeria: From Farm to Plate amidst COVID-19

The Nigerian food supply chains have been impacted on several fronts by the COVID-19 pandemic, changing the landscape of the food supply system from farm to plate

⁴³ "African governments mobilize to keep people fed during" 9 Apr. 2020, <https://allianceforscience.cornell.edu/blog/2020/04/african-governments-mobilize-to-keep-people-fed-during-COVID-19-lockdowns/>

⁴⁴ "Measures countries are taking to guarantee food security in" 10 Apr. 2020, <https://agra.org/ourharvest/april-20/measures-countries-are-taking-to-guarantee-food-security-in-the-face-of-COVID-19/>

⁴⁵ "African governments mobilize to keep people fed during" 9 Apr. 2020, <https://allianceforscience.cornell.edu/blog/2020/04/african-governments-mobilize-to-keep-people-fed-during-COVID-19-lockdowns/>

in Nigeria. Figure 1 shows the structure of a typical agricultural supply chain. When we look at other stages in the agricultural supply chain close to smallholder farmers, like aggregation by off takers and transportation, demand for commodities like ginger and cocoa slumped at the initial stage of the lockdown⁴⁶. The movement of food trucks might have looked like smuggling but that is still an issue during the movement restrictions. The government of Nigeria has since allowed the movement of essential products like food and pharmaceuticals⁴⁷. However, due to road checks and clearances, intra-country movement of food trucks have been relatively slow. States that have a low number of reported COVID-19 cases place a high restriction on entry from states that are hotspots for the virus, and this is understandable. **The post-harvest losses of perishables and high value commodities like meat, milk, fruits, and vegetables are on the increase everyday** due to the disruptions in the food supply chains occasioned by the COVID-19 pandemic.

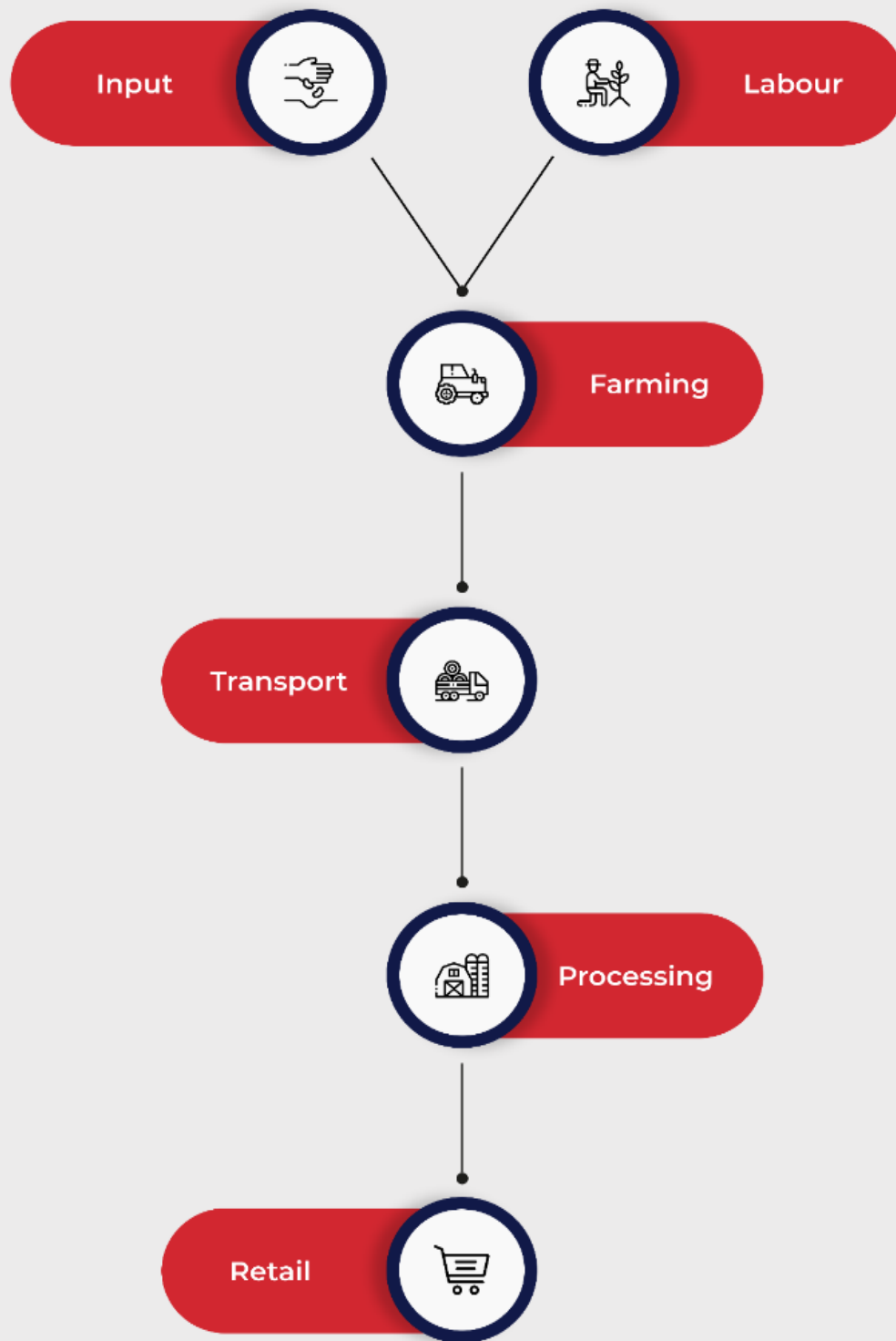
Changing the narrative of Nigerian food supply chains with innovative solutions amidst the COVID-19 pandemic.

As efforts to curtail the spread of the virus, many Nigerians have stopped leaving their homes because of official restriction of movements, in conjunction with increased anxiety. However, to meet the demand for food items in Nigeria during the COVID-19 pandemic, many innovative solutions have sprung up along the food supply chains to meet the needs of Nigeria's population. Several companies and government agencies such as agribusiness, agtech, e-commerce and logistic companies are playing crucial roles to ensure that food supply chains are not adversely affected by the pandemic. **For example, the lockdown policies have increased demand for home delivery of food, perishable and non-perishable goods. These companies have joined forces to create a contactless delivery interface for in-app courier services that enables the pick-up or delivery of items to customers' homes or in a convenient location to avoid personal interaction.** Also, the government has taken other environmental, social and economic steps and agreed to shut all the country's land borders, informal markets and limit social gathering in order to halt the spread of the COVID-19.

⁴⁶ "COVID-19: Agro commodity export sinks amidst slump" 26 Apr. 2020, <https://guardian.ng/features/covid-19-agro-commodity-export-sinks-amidst-slump-demand-price-crash/>

⁴⁷ "COVID-19: Joint Technical Task Team Lauds Compliance to" 30 Apr. 2020, <https://fmard.gov.ng/covid-19-joint-technical-task-team-lauds-compliance-to-presidential-directive-on-free-movements-on-agricultural-inputs/>

Agriculture Supply Chain



agramondis

Figure 1: Conceptual diagram of an agriculture supply chain.

Watching the pandemic strains on the food system helps one to regularly recognize the various constraints on the food supply chain. **The five dimensions of the food supply chain are: production, processing, distribution, retailing and consumption. Every of these aspects has been adversely affected by the pandemic.**

6.1 Production and processing

- Owing to Nigeria's vulnerability to COVID-19, the grain supply chain has been interrupted mainly due to the movement restrictions across state lines and social distancing measures. The Nigerian government has been compelled to plunge into the National Grain Reserves to provide food to needy households.
- An additional burden to the health and food security are the exposure of farm labourers who are frequently required to operate with minimal safety and without the right to follow the social distance laws.
- Limitation on the transportation of seeds and agrochemicals will affect the next planting cycle
- The current season's harvest and new season planting are threatened because of limitations on farmworker movement.

6.2 Distribution

- The Kobo360 Trucking Logistics Company announced that 30% of its fleet in Nigeria, Kenya, Togo, Ghana, and Uganda are not operational because of the pandemic⁴⁸. Some farmers have claimed that crops are rotting in the fields or in depots waiting for shipments that never come.
- Lockdowns and restrictions on travel limit people's ability to access food and create food shortages in places in which the procurement of food requires transportation.
- The prices of some staple foods like garri and rice in Nigeria have increased. However, for rice the increase could further be linked to the export restrictions of key exporters of rice to Nigeria.

⁴⁸ "How Africa risks reeling from a health crisis to a food crisis - PRI." 24 Apr. 2020, <https://www.pri.org/stories/2020-04-24/how-africa-risks-reeling-health-crisis-food-crisis>

6.3 Retailing

- The demand for innovative solutions to provide access to fresh produce at consumers doorstep increased.
- Regional food basket prices are raised because of disruptions, temporary shortages, hoarding and income in the retail value chain.

6.4 Consumption

- The lockdown has elicited a panic buying spree by customers, temporarily emptying supermarket shelves, and increasing wastage due to unconsumed fresh food.
- Reduced wages and income cuts that impacted the most disadvantaged contributed to more people becoming poorer. There is already less economic access to food, especially fresh fruit, and vegetables for the poorest.
- Nigerians' adaptation mechanisms include changes to diets that are more balanced and pre-packaged as fresh fruits and vegetables become less available.

Before the COVID-19 pandemic, there was already an existing gap in the Nigerian food supply chain, and this led to the importation of food items from other countries to augment local production in order to meet the local demands for food. With this pandemic, the Nigerian food supply chain has further been disrupted along each segment of the supply chain ranging from production, processing, distribution, retailing to consumption. However, some of the actors along the food supply chain are adopting different innovative solutions to keep the supply chain afloat during this COVID-19 period. If most of these new innovative solutions and the already existing ones are further refined, they will not only help to develop the food supply chain in Nigeria but also ensure food safety and security during and after the COVID-19 period.

7. Food Security in Nigeria

In our [previous article](#) about food security and agricultural value chains in the COVID-19 pandemic, we highlighted the indicators of food security (see Figure 2) and

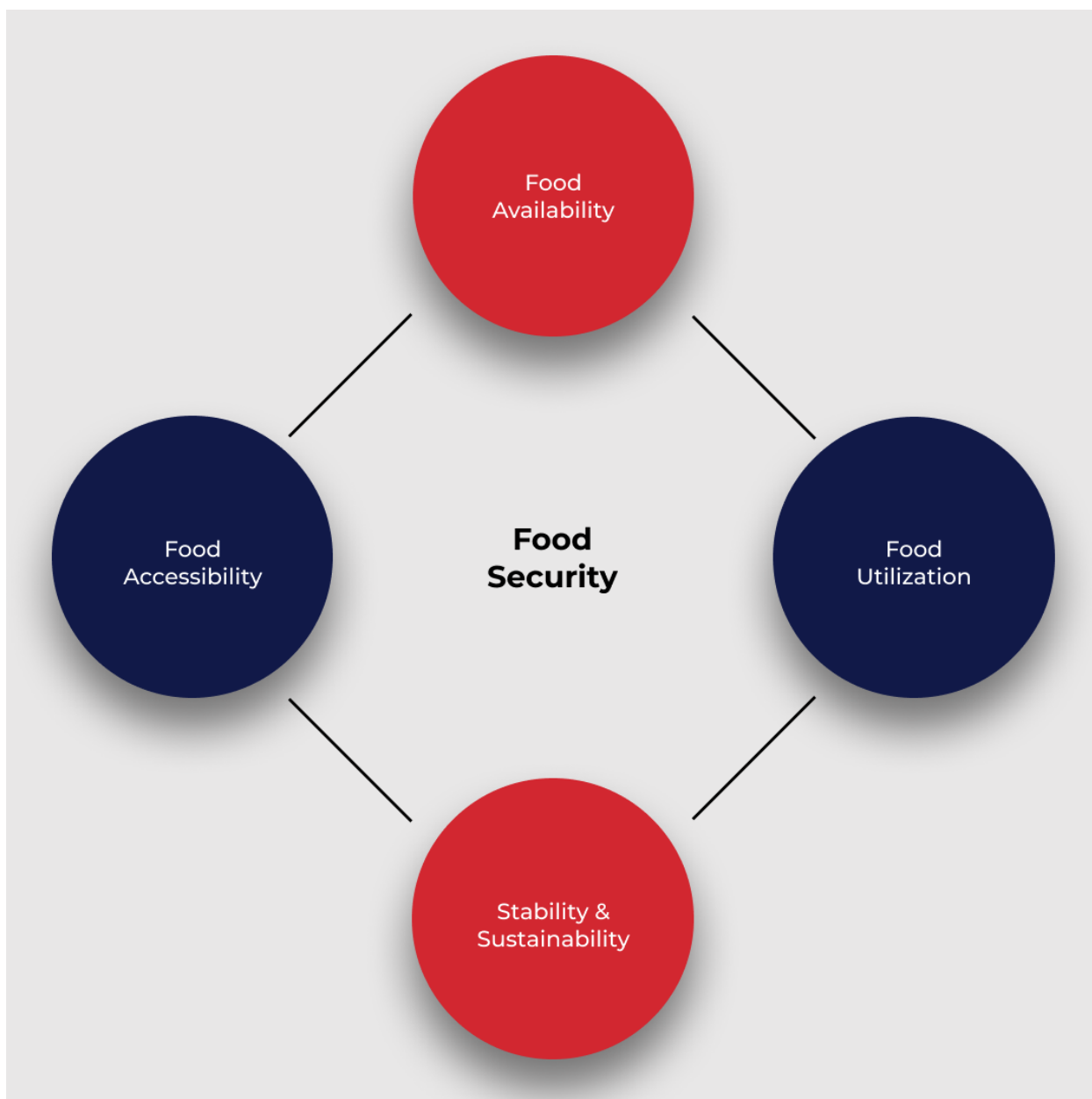


Figure 2: Components of food security (FAO definition).

explained how the pandemic has affected and could negatively affect these indicators. In this section, we focus on the state of food security in Nigeria.

The state of food security in Nigeria is already fragile enough. **Prior to COVID-19 pandemic, Nigeria's agriculture sector had existing issues like**

underdeveloped smallholder value chains, food deficit and internal conflict.

Existing markets in the country are fragmented and disintegrated from the farm leading to incohesive actions and logistic bottlenecks for transporting farm produce to the market. **As of 2017, the FAO estimated Nigeria's public storage capacity**

to be 300,000 tonnes⁴⁹, making it infeasible to handle the annual output of maize alone, which is 7 million tonnes, hence leading to high post-harvest losses. The socio-economic characteristics of households usually determines their level of food security and non-professional workers (traders, etc) are at the lower end of this spectrum. Only about 18.5% of the Nigerian population are wage or salary workers⁵⁰ which makes roughly 80% of the population reliant on earnings from daily transactions and hence more prone to food insecurity. So, when the COVID-19 pandemic was confirmed in the country, the immediate response to curtail its spread affected transportation, availability of labour, and ability to make daily non-professional transactions which then exacerbated the existing issues and brought them to the attention of everyone.

The following are some of the actions that have been taken and proposed by different actors with regards to making food available and accessible to the population, mainly with regards to inventions and human ingenuity, and import and export policies.

Food security was an issue pre-COVID-19 and its effects only underscores the need for inventions and human ingenuity to tackle these challenges.

If there is one positive thing that the pandemic has highlighted in Africa, it is innovation. It is easy to get lost in the myriad of human ingenuity that has sprouted in Africa since the Algerian Ministry of Health reported the first confirmed case of COVID-19⁵¹. From an online COVID-19 symptom checker⁵² developed in Nigeria to an automatic hand washing tap⁵³ developed in Sierra Leone, entrepreneurs keep coming up with innovations. The agriculture and food sectors are not left out either as physical ability to access food is limited due to restrictions on movement by the Nigerian government to flatten the curve (reduce the spread of the virus). Following the initial 14-day lockdown in Nigeria, ecommerce platforms like Jumia adapted their websites to cater for the demands of consumers by implementing a contactless safe

⁴⁹ "Country fact sheet on food and agriculture policy trends ... - FAO." <http://www.fao.org/3/a-i7675e.pdf>.

⁵⁰ "Wage and salaried workers, total (% of total employment" <https://data.worldbank.org/indicator/SL.EMP.WORK.ZS>

⁵¹ "covid-19 - ReliefWeb." 4 Mar. 2020, https://reliefweb.int/sites/reliefweb.int/files/resources/SITREP_COVID-19_WHOAFRO_20200304-eng.pdf.

⁵² "COVID19 Symptom Checker - CompleteCare." https://www.kompletecare.com/sym_checker.

⁵³ "Mohammed Akamara's Innovation, Lili Tap, Helps Small" 13 Apr. 2020, <https://www.tonyelumelufoundation.org/making-impact-during-covid-19-pandemic/mohammed-akamaras-lili-tap-provides-africans-in-sierra-leone-a-safer-and-unique-handwashing>.

delivery option⁵⁴ to abide by the social distancing rule. In fact, other related platforms that either process little volumes of online orders or nothing at all have now integrated and prioritized the use of online shopping and door delivery to meet the demands of Nigerians. For example, Spar Nigeria which operates 14 hypermarkets in several major cities around the country changed their store opening hours and introduced online ordering for home delivery to adapt their business to the change⁵⁵.

Also, to supplement the food available to the population whose survival depends on daily earnings, different interventions have been recorded. One example of such a platform is 'Beating Corona' which is a one-stop online repository to track the interventions that support the availability of food items, medical supplies, and so on to match help to people that need it during these trying times⁵⁶.

In an interview on CNBC Africa with Akintunde Sawyerr, founder of Agricultural Fresh produce Growers and Exporters Association of Nigeria (AFGEAN), Sawyerr proposed that one thing that could be done to improve the efficiency of the movement of food and prevent unnecessary stoppages is to apply a strategy the Health and Law enforcement sector use; their vehicles are marked with sirens or bright lights that show that they are of high priority⁵⁷. He is of the opinion that temporarily borrowing this 'food ambulance' idea from these sectors could help achieve the required priority level food movement needs and also reduce wastage of high value commodities and perishables in the sense that travel time will considerably reduce. As Jolene Dawson, Development Partnerships Global Agriculture Lead at Accenture, said at Nourishing Africa's webinar on COVID-19 (Leveraging Innovation and Technology to Avert a Looming Food Crisis in Africa) "This is a good time for farmers to adapt production to increase shelf life by using simple but powerful technologies like sun drying [for example]⁵⁸." This would not only decrease the weight of produce and reduce post-

⁵⁴ "Jumia implements "Contactless" Delivery and "Cashless" <https://group.jumia.com/jumia-implements-contactless-delivery-and-cashless-payments-in-response-to-the-covid-19-in-africa/>.

⁵⁵ "SPAR Nigeria introduces easy online ordering with home delivery." 4 Apr. 2020, <https://spar-international.com/news/spar-nigeria-introduce-easy-online-ordering-with-home-delivery/>.

⁵⁶ "All Interventions - BeatingCorona.NG." <https://beatingcorona.ng/all-interventions/>

⁵⁷ "How Nigeria can ensure food security during the COVID-19" 24 Apr. 2020, <https://www.cnbc africa.com/videos/2020/04/24/how-nigeria-can-ensure-food-security-during-the-covid-19-lock-down/>..

⁵⁸ "COVID-19: Leveraging Innovation and Technology to Avert a" 7 Apr. 2020, <https://nourishingafrica.com/podcast/covid-19-leveraging-innovation-and-technology-to-avert-a-looming-food-crisis-in-africa/>.

harvest losses, but it would also reduce the cost per unit of farm produce spent on logistics and thereby saving the farmers' money.

Shifting towards less imports, while keeping regional and cross-border trading stable.

About 30% of live animals slaughtered in Nigeria are imported from neighbouring countries because domestic production of livestock products is far below the national demand⁵⁹. In fact, it is less than half the demand, making Nigeria a net-importer of livestock and livestock products. Domestic fish production also falls below the total demand, so the country imports fish too. **Early disruptions in the international supply chain which could**

“About 30% of live animals slaughtered in Nigeria are imported from neighbouring countries because domestic production of livestock products is far below the national demand.”

affect the supply of processed foods might put more pressure on local crop production. However, as Maximo Torero, chief economist at the Food and Agriculture Organization of the United Nations highlighted at an interview with Wande Kazeem of Wandieville media⁶⁰: The trade restrictions at the borders of African countries are not much when compared to the 2007/2008 financial crisis where more than half of the continent representing about 28% of the total value of export restricted exportation. This pandemic has seen 10 countries raise export restrictions at their borders⁶¹ which represents a small percentage of the total export value of Africa. In fact, the number of countries with border restrictions might decline as more countries see the importance of a cohesive response like inter-regional trade to tackling the socio-economic effects of the pandemic. At the African Agri-Council webinar, “The Impact of COVID-19: Agri-Food Crisis Management”, Dr. Golden Mahove, Chief of Party at USAID Southern Africa Trade and Investment Hub emphasized the importance of regional inter-trade and cross-border trading amongst

⁵⁹ "Nigeria at a glance | FAO in Nigeria | Food and Agriculture" <http://www.fao.org/nigeria/fao-in-nigeria/nigeria-at-a-glance/en/>

⁶⁰ "COVID-19 risk to food-chain supply in Africa with ... - YouTube." 5 May. 2020, <https://www.youtube.com/watch?v=SExRYMbWaz8>

⁶¹ "pdf Trade Responses to the COVID-19 Crisis in Africa - Open" <https://openknowledge.worldbank.org/bitstream/handle/10986/33548/Trade-Responses-to-the-COVID-19-Crisis-in-Africa.pdf?sequence=1>

African countries during this pandemic to ensure food supply chains stay alive⁶². In the same webinar, Quentin Rukingama, Managing Partner at JBQ Africa seemed to have separately come to the same conclusion as Ndidi Nwuneli of Sahel consulting in her OP-ed: Strengthening West Africa's fragile food ecosystems⁶³, about the urgency and importance of a data-driven agricultural value chain to bridge the information gap between the demand and supply of food.

As Papa Seck, Chief Statistician of the United Nations Women said at Devex and Facebook's webinar (How data can mitigate the impact of COVID-19 on women and girls)⁶⁴, "data alone cannot change the world, but we need data to save it". It is becoming increasingly important for Nigeria to consistently collect and keep data on its food production and consumption to inform accurate decisions by not just industry stakeholders but also by public offices. This pandemic has also highlighted how Africa needs to be cohesive in its fight for food security by putting the infrastructures in place to encourage interregional trade.

8. Effects of other Pandemics and Epidemics on Food Supply Chains in Nigeria

This section draws lessons from previous outbreaks, their causes, effects, how they were handled and what we can learn as a country to help deal better with COVID-19.

Epidemics and pandemics affect not just the health of a population but also disrupt all activities that the population is involved in. Without good health, people can either not work at all or underperform. The remaining population that isn't infected then rightfully grow a fear for it, especially for infections that can be contracted by human-to-human transmission like COVID-19, Ebola Virus Disease (EVD), etc. Ebola was quickly prevented from becoming an epidemic in Nigeria, so it did not have a sizable

⁶² "Managing the Agri-Food Sector in Unprecedented ... - YouTube." 22 Apr. 2020, <https://www.youtube.com/watch?v=sSA3XDQcsyU>.

⁶³ "COVID-19: Strengthening West Africa's Fragile Food" <https://sahelconsult.com/covid-19-strengthening-west-africas-fragile-food-ecosystems-ndidi-nwuneli/>.

⁶⁴ "How data can mitigate the impact of COVID-19 on ... - YouTube." 12 May. 2020, <https://www.youtube.com/watch?v=8P9bxu4GpuA>

effect on the food supply chain⁶⁵. Also, the Severe Acute Respiratory Syndrome (SARS) outbreak, which is also caused by the coronavirus was experienced in Asia but not Nigeria. COVID-19 is the third coronavirus to be identified in humans (MERS being the second) and according to Dr Seth Berkley, CEO/Epidemiologist at the Global Vaccination Initiative (GAVI), there are about 30,000-odd isolated coronaviruses in animals, and they will most likely emerge in deforested areas and environments under stress from climate change⁶⁶. A research on SpringerLink about climate change in Africa named the Nigerian coast and some other highly populated regions as places that have an increase in overall intensity of heat stress, which means they are prone to climate change⁶⁷. Also, rainfed agricultural systems, like Nigeria's are particularly vulnerable to climatic changes making Nigeria's coastal areas a viable place for outbreak of infectious diseases. So, cutting back on deforestation in areas under stress from climate change and supplying the additional cooling demand required to prevent heat stress across the country could reduce how prone the vulnerable population is to infectious diseases. A proactive approach will be to invest in research that looks for vaccines to the coronavirus that can harm humans. Table 1 below summarizes previous epidemics/pandemics and their origins.

8.1 The Impacts and lessons from other epidemics/pandemics

Analysing the outbreak and effects of other pandemics and epidemics in the past, Nigeria can learn from the following eight lessons:

1. The SARS and MERS outbreaks had relatively little impact on the economy and food security of China (including Hong Kong and Taiwan) largely due to the country's resilience and ability to cope with emergencies.

⁶⁵ "How Did Nigeria Quash Its Ebola Outbreak So Quickly" 9 Oct. 2019, <https://www.scientificamerican.com/article/how-did-nigeria-quash-its-ebola-outbreak-so-quickly/>

⁶⁶ "Deforestation And Climate Change Could Unleash A ... - Forbes." 1 Apr. 2020, <https://www.forbes.com/sites/jeffmcmahon/2020/04/01/there-are-30000-more-coronaviruses-environmental-disasters-are-bringing-them-to-your-door/>

⁶⁷ "Climate change in Africa: costs of mitigating heat stress" 6 Apr. 2019, <https://link.springer.com/article/10.1007/s10584-019-02405-w>

Table 1: Epidemics/Pandemics and their origins.

Epidemic/Pandemic	Year of Outbreak	Origin/Cause	No of deaths Nigeria/Worldwide
COVID-19	2019	As-yet-uncertain animal reservoir of coronavirus	345/405,074*
Ebola	2014	Body fluids of wild animals (fruit bats, gorillas, monkeys, etc.) infected with Ebola virus	8/11,323
MERS	2012	Coronavirus	0/838
SARS	2002-2004	Animal (camel, bats) infected with a type of coronavirus	0/8,098

* Numbers are reported as of June 2020 and are subject to change based on the ongoing nature of the COVID-19 pandemic.

2. Ebola had an economic impact on some African countries' agricultural production, marketing, and trade. On the production side, due to road blockages, farmers had limited access to inputs such as seeds, fertilizers, and insecticides. Many of the regions faced acute labour shortages during the period of the Ebola outbreak.
3. There is a need to closely monitor food prices and markets. Transparent dissemination of information will strengthen government management over the food market, prevent people from panicking, and guide farmers to make rational production decisions. To nip market speculation over supply in the bud, the government should strengthen market regulation.
4. It is necessary to ensure international and national agricultural and food supply chains function normally. China has set a good example of how to ensure food security during the current epidemic by, for instance, opening a "green channel" for fresh agricultural products, and banning unauthorized roadblocks.
5. Social safety nets are needed to protect those who are the worst affected and most vulnerable. These safety nets, which could be in the form of cash or in-kind transfers (context-specificity is important here), should be accompanied by intervention by health and nutrition officials, because investing in the health and nutrition of vulnerable populations could lower the mortality rate of

diseases such as COVID-19 — as nutritional level and mortality rates are intricately linked. Social safety nets are also crucial in the post-epidemic period to drive "reconstruction" efforts.

6. More investment is needed to build an even more resilient food system. Such investment must come from national governments as well as the international community, as enhancing the capacity of developing countries to prevent or contain a food security crisis is a collective effort. In today's highly interconnected world, contagious diseases such as SARS, Ebola, avian flu and COVID-19 could easily travel across borders.
7. There is also a need to build safeguards for the prevention and control of zoonotic diseases. The international community needs to do more to prevent future outbreaks of zoonotic diseases such as Ebola, SARS and avian flu, including regulating meat, seafood, and wildlife markets. Many zoonotic diseases originate in wildlife — HIV, Ebola, MERS, SARS, and possibly COVID-19 too, all originated in wildlife and jumped to humans.
8. It is important to ensure the smooth flow of global trade and make full use of the international market as a vital tool to secure food supply. And global institutions such as the World Trade Organization, FAO, World Bank, and the International Monetary Fund must ask countries to not use COVID-19 as an excuse to issue trade protectionist policies.

9. Global Innovative COVID-19 Response Strategies and the Nigerian Relevance

Africa has a history of being the continent that is worst hit by pandemics and disease outbreaks of this magnitude. During the infamous 1918 influenza outbreak, Africa had the highest average mortality rate, despite being hit with the virus later than other continents.⁶⁸ Also, the deadly Ebola Virus Disease which killed over twelve thousand people and had an extremely high average mortality rate of 50% affected Africa (West Africa specifically) the most.⁶⁹

⁶⁸ "Coronavirus: far to go before rivalling Spanish Flu of 1918." <https://www.theafricareport.com/25113/coronavirus-far-to-go-before-rivalling-spanish-flu-of-1918/>

⁶⁹ "WHO Ebola Virus Disease Fact Sheet." <https://www.who.int/news-room/fact-sheets/detail/ebola-virus-disease>



Pandemics like this have always had huge impacts on food security⁷⁰ and, although the COVID-19 pandemic is yet to fully affect global food security⁷¹, many governments at all levels, as well as civil society organizations and the private sector, are already applying positive policy actions to protect food environments and to attenuate the impact that the pandemic may have on local and global food security. If Nigeria hopes to solve the food security threat and supply chain challenges that may arise from this pandemic, there's a lot that can be learned from other governments. In this section,

we carefully consider a few of the food security responses from around the world that may be relevant for Nigeria. After carefully looking at the multiplicity of response efforts around the world, we look at the responses from three governments, U.S., European Union and China, and analyse their relevance to the Nigerian context.

9.1 U.S. government response

The U.S. is currently, statistically, the worst hit by the pandemic. To ensure that its citizens can get the food that they need for proper nutrition, the government passed the Coronavirus Aid, Relief, and Economic Security Act or the "CARES ACT" (Enacted

⁷⁰ "Food Security in a Pandemic - Pan American Health Organization" <https://www.who.int/news-room/fact-sheets/detail/ebola-virus-disease>

⁷¹ "International Food Policy Research Institute" <https://www.who.int/news-room/fact-sheets/detail/ebola-virus-disease>

March 27, 2020)⁷² which is a \$2 trillion relief package, which includes stimulus checks, bailouts to industries, and loans and grants for businesses. In terms of meeting food needs⁷³, this legislation provides \$8.8 billion for the Child Nutrition Programs, \$15.8 billion for Supplemental Nutrition Assistance Program (SNAP), which includes funding for the Indian Reservation program, Puerto Rico, Northern Mariana Islands and American Samoa, and finally, \$450 million more for food banks and other community food distribution programs. These allocations will help to cover the projected increase in SNAP beneficiaries under another legislation, the Families First Coronavirus Response Act.

In practical terms, this means that the U.S. government understands the impact that the COVID-19 pandemic will have on the availability and distribution of food, and how that will in turn hurt the nutrition of children and other vulnerable groups. This step is a pre-emptive one that assumes that food will likely be scarce and mitigates that risk before it even occurs. **It will help for Nigeria to also begin to take policy measures that directly impact food supply, accessibility and overall food security before it becomes an issue.**

9.2 European Union government response

Following the outbreak of COVID-19, the European Union's agri-food sector is showing its resilience and continues to provide Europeans with high quality and safe food. Nonetheless, farmers and producers are facing difficulties and increasing pressure. Since the beginning of the crisis, the European Commission has been in close contact with Member States and sectoral organizations to closely monitor the situation and act. To keep food flowing, the Commission issued practical advice and guidelines on the movement of goods and critical workers. Some of the areas outlined in the policy are:⁷⁴

- **Guidelines to ensure an efficient food supply chain:** This includes the creation of a "Green Lane" which guarantees the free passage of all goods,

⁷² "Coronavirus Aid, Relief, and Economic Security Act or the CARES ACT"

<https://www.documentcloud.org/documents/6819239-FINAL-FINAL-CARES-ACT.html>

⁷³ "What's Inside The Senate's \$2 Trillion Coronavirus Aid Package" <https://www.npr.org/2020/03/26/821457551/whats-inside-the-senate-s-2-trillion-coronavirus-aid-package#top>

⁷⁴ "CORONAVIRUS: Emergency response to support the agriculture and food sectors"

https://ec.europa.eu/info/sites/info/files/food-farming-fisheries/farming/documents/factsheet-covid19-agriculture-food-sectors_en.pdf

including agri-food products and special mobile workers who qualify as critical in the fight against the COVID-19 pandemic can reach their workplace.

- **Measures directly supporting farmers and rural areas:** This includes flexibility in the use of financial instruments under rural development that allows farmers and other rural development beneficiaries to benefit from loans or guarantees to cover operational costs of up to €200,000 at favourable conditions. Also, the commission proposes new rural development measures that allows EU countries to offer support of up to €5,000 per farmer and €50,000 per small and medium enterprise (SME).⁷⁵ Other measures include higher advances of payments to increase the cash flow of farmers and higher state aid for farmers and food processing companies that allows farmers access up to €100,000 per farm while food processing and marketing companies can benefit from a maximum of €800,000.⁷⁶

Nigeria can also learn from these strategies deployed by the EU to allow for easy passage of agro-products, either in partnership with other African countries or even within the country. **Also, the idea of offering loans to food processors and farmers during this period to allow them continue food production and processing will be key to ensuring food security. However, considering that the majority of farmers in Nigeria are smallholder farmers who hardly have any data with the government, the government would have to devise creative ways to ensure that the loans are judiciously used and paid back else it risks a financial crisis.**

9.3 *Chinese government response*

Following the appearance of COVID-19 in China, the State Council set up the Joint Prevention and Control Mechanism which comprised thirty two (32) departments; epidemic prevention and control, medical treatment, scientific research, publicity, foreign affairs, logistics support, agriculture among other things.⁷⁷ One of the policy

⁷⁵ "CORONAVIRUS: Emergency response to support the agriculture and food sectors"

https://ec.europa.eu/info/sites/info/files/food-farming-fisheries/farming/documents/factsheet-covid19-agriculture-food-sectors_en.pdf

⁷⁶ "CORONAVIRUS: Emergency response to support the agriculture and food sectors"

https://ec.europa.eu/info/sites/info/files/food-farming-fisheries/farming/documents/factsheet-covid19-agriculture-food-sectors_en.pdf

⁷⁷ "Local food systems and COVID-19: A look into China's responses" <http://www.fao.org/in-action/food-for-cities-programme/news/detail/en/c/1270350/>

documents that was released expressed support in ensuring stable production and supply of agricultural products during the pandemic, highlighting the “Food Basket” programme Mayor Responsibility Mechanism initiated in 1980s⁷⁸. In addition to this, the Chinese government also took some contextual and local measures to ensure food security. Some of the measures are highlighted below:

- **Measures to ensure production:** In low-risk regions, production is required to completely resume while measures to prevent imported cases are conducted. In medium-risk regions, production is resumed step by step with necessary epidemic control measures in place. In high-risk regions, resuming production is carefully organized by requiring farmers to go to their fields separately at different times while main efforts are focused on epidemic control. To ensure supplies of agricultural inputs needed for production, governments have urged inputs suppliers to restart working and increase workload under required precaution measures. In the case of input shortage, the government will organize supplies from input companies in other provinces. For example, Hubei province faced a large supply gap in agricultural inputs due to the lockdown restrictions. MARA responded together with the Ministry of Industry and Information Technology and National Supply and Marketing Corporation, to deliver 700,000 tonnes of fertilizers and 2,520 tonnes of pesticides from outside Hubei.⁷⁹ Same kind of strategy has been deployed in other provinces in China as well. Financial support is also provided to farmers to ensure they have sufficient funds for production.
- **Measures to match supply with demand:** Before the COVID-19 pandemic, the Chinese government had already put measures in place to ensure the supply of food was met with supply. Policies that supported the establishment of government owned e-commerce food supply were established. Locally, governments of provinces and municipalities also established online service platforms to better assist local transactions. For example, Beijing’s Agricultural Products Supply and Demand Platform⁸⁰ included not only product supply

⁷⁸ “Vegetable basket project interactive Q&A” Translated with Google Translate http://guoqing.china.com.cn/zhuanti/2014-07/04/content_33655816.htm

⁷⁹ “Local food systems and COVID-19: A look into China’s responses” <http://www.fao.org/in-action/food-for-cities-programme/news/detail/en/c/1270350/>

⁸⁰ “China launches national e-commerce platform to support” https://www.chinadaily.com.cn/business/2015-11/06/content_22383910.htm

information but also farmers' demand in agricultural inputs and other equipment, which is of great help for both production and sales for farmers.

There are other measures like logistics and market monitoring that the government of China put in place to help the food security situation there and one of the key lessons for Nigeria to learn from this is that multi-stakeholder collaboration and coordination at different levels is crucial for immediate and effective outcome. Under such an unprecedented global crisis circumstance, it is pivotal that policy makers could take full advantage of synergies between all stakeholders/actors involved in the food system who have specific expertise, to ensure food supply and minimize adverse effects. Additionally, an efficient mechanism to consolidate and share information and coordinate tasks between actors as well as between internal departments of each actor is essential.

In conclusion, for Nigeria to fully prepare for, and possibly overcome, the challenges that this pandemic might pose to food security in the country, the learnings from the three countries are relevant in two key respects:

- Just like the EU, Nigeria needs to pursue trade policies in collaboration with the neighbouring countries that allow for easy, if not free, flow of food across the borders.
- Like the examples in China & USA, Nigeria also needs to create financial policies that allow farmers and other key actors in the food supply chain to access credit that allows them to continue their activities.



10. Nigerian Food Supply Chains in Post-COVID-19

Food supply chains are a complex network that involves the interactions of several actors such as producers, agricultural input suppliers, logistics companies, processing plants, retail companies, and consumers. As COVID-19 spreads and the number of cases increase, countries around the world including Nigeria are adopting stricter measures to curb the spread of COVID-19 and the global food system will be tested during this period and beyond. **However, it is already noticeable in Nigeria the challenges in terms of logistics involving the movement of food with produce not being able to move freely from different states and within states.** Also, the pandemic's impact on livestock sector due to reduced access to animal feed and slaughterhouses' as well as cross border transportation of livestock from neighbouring countries have diminished capacity (due to logistical constraints and labour shortages) like what happened in China⁸¹.

10.1 A snippet of the Nigerian food supply chain landscape after the oil boom

Nigerian food supply chain since the "oil boom" of the 1970s has had a significant impact on the importation of food items from other countries that Nigeria has direct or indirect trade relationships with. According to National Bureau of Statistics (NBS), Nigerian's spending on imported food items rose up from the NGN12.77 trillion recorded in 2010 to NGN22.78 trillion in 2019⁸². This trend of inflow of imported food products into Nigeria is destructive to its mono-economy that relies virtually on crude oil. Nigeria has many human and natural resources and opportunities in agriculture, as all the states in Nigeria can be used to cultivate one agricultural product, and these can be used in the production of several food products. **If the agricultural value chains are improved by innovative agricultural technologies, it will help to increase local food production, increase agricultural products export and smoothing the food supply chain as well as boost the Nigerian economy**⁸³.

⁸¹ "impact on food and agriculture - Food Security Cluster."

https://fscluster.org/sites/default/files/documents/fao_qa_impact_on_food_and_agriculture.pdf

⁸² "Nigerians Spent NGN22.78 Trillion on Imported Food Items in 2019." 11 May. 2020,

<https://allafrica.com/stories/202005110093.html>

⁸³ "Innovation in Food Value Chains in Nigeria | The World of" <https://worldfoodscience.com/article/innovation-food-value-chains-nigeria>

10.2 Vulnerabilities of the Nigerian food supply chains amidst the COVID-19

With the continued spread of COVID-19 we are further plunged into a global health crisis and bringing economies into halt. By accounts of medical experts, we are only at the early stages of the pandemic, so it is going to reshape the world economy, society and politics. During the pre-COVID-19 crisis, many families around the world including Nigeria were spending a lot of time and energy thinking about getting access to food. **In the face of the crisis, the most vulnerable in developing countries in Africa and Asia like Nigeria are confronted with loss of their income spent mainly on food and this is an immediate threat which should be prioritized by Nigerian government.** For many others, simple access to shops has also become very worrying and needs swift attention. Even the wealthy are increasingly thinking about food access currently⁸⁴.

COVID-19 has the potential to further disrupt the food supply chains in Nigeria, including between rural and urban areas, as well as producing states and consuming states. Movement or import/export restrictions could result in challenges to transporting food and access processing units and markets, affecting both producers and consumers. **This can lead to reduced farmers' incomes and instability of food prices deviating from geographical and seasonal patterns, thus creating uncertainty for both producers and consumers.** This is likely to have significant adverse effects particularly on the most vulnerable actors, such as informal labourers, vulnerable urban populations, displaced populations, and others that rely on the informal market to meet their food needs. Reduced or lost wages, unstable prices, and haphazard availability of essential food would have serious implications for acute food security and malnutrition levels in these populations in Nigeria.

10.3 Prospect of the Nigerian food supply chains

The important aspects that will contribute to a positive food supply chain in the post COVID-19 period in Nigeria include food processing and value addition, farmers' cooperatives, E-commerce platforms, optimization of value chains, among others⁸⁵.

⁸⁴ "The COVID-19 crisis and food systems: addressing threats" 23 Mar. 2020,

<https://www.gainhealth.org/media/news/covid-19-crisis-and-food-systems-addressing-threats-creating-opportunities>

⁸⁵ "Impact of Coronavirus (COVID-19) on Africa's Agriculture" 14 Apr. 2020, <https://www.selinawamucii.com/impact-covid-19-africas-agriculture/>

However, changes are already taking place across the food supply chains and agricultural landscape in Nigeria that will last during and after the COVID-19 pandemic. As a result of these changes, the food supply chains in Nigeria will change in several ways, some of which have already started manifesting or underway.

Food processing and value addition: As more countries around the world focus on ensuring critical food supply chains are not interrupted during and post COVID-19 period, one likely outcome is that countries like Nigeria will seek to have control of their own food production, and reduce reliance on importation of food items from other countries. This is because when food supply chains are disrupted by closed borders, countries such as Nigeria will need to weigh the risks that go with over reliance on other countries to feed themselves.

With these changes, Nigeria will have to focus more on developing and improving its own food supply chains, including production, processing, transportation, and value addition, if the Nigerian agricultural value chains are to survive in the post COVID-19 period. Furthermore, Nigerian industries that import agricultural raw and semi-processed materials like cereals, wheat, raw sugar, crude fertilizers, among others will have to assess the impact of the food production as a result of disruption of the food supply chains by the import and export restrictions. **To reduce the food supply chain risks, more processors in Nigeria might consider moving their processing plants closer to the production areas in the rural and suburban areas, as opposed to hundreds to thousands of miles away in the urban centres.**

Farmers' cooperatives: Prior to the COVID-19 pandemic, many Nigerian smallholder farmers have been considered as a vulnerable population, exposed to extreme poverty and hunger. Given their already vulnerable position, with little if any cushion the effect from a global pandemic, these farmers will suffer more from the immediate, short- and long-term effects of the COVID-19 pandemic. What this pandemic will expose is the lack of reliable channels to deliver much needed support such as inputs and market access for smallholder farmers' farm produce during the COVID-19 pandemic.

The smallholder farmers in Nigeria who will benefit more from any intervention by the federal and state governments or development

organizations are those that are already organized into functional cooperatives/groups. The cooperatives are an effective channel through which governments and other development partners can provide support to smallholder farmers. In the post-COVID-19 period, the cooperatives are very key to supporting enhanced production and productivity, value-addition, and also market-access for smallholder-grown produce while also providing a safety net against market effects during a time like this. In the post COVID-19 period, cooperatives will offer a strong avenue for the mobilization and empowerment of smallholder farmers through training, access to inputs, credit, and the benefits of economies of scale derived from market access in Nigeria. Thus, the revival and sustainability of the farmers cooperatives among the Nigeria family farmers will be tested and strained.

E-commerce platforms: It is becoming increasingly clear now that e-commerce is no doubt going to be an important channel for market access for smallholder farmers in Nigeria along the food supply chains. With the restrictions of movement and social distancing measures to curtail the spread of COVID-19, e-commerce is a reliable additional channel for market access for farmers and consumers. **The food supply chains in Nigeria are already being enhanced by e-commerce companies with substantial success in Nigeria and these companies include; Farmcrowdy, Jumia, Konga, among others and this gives a signal as to how farmers will access markets in the future during the post COVID-19 period in Nigeria.**

Market access of specialized platforms and marketplaces for farmers across Nigeria are going to facilitate the trend of food supply chains during and after COVID-19 pandemic period. Agri-food E-commerce is also going to be fuelled by the shift from dominant cash transactions to cashless transactions, including mobile money, internet banking in Nigeria and this will be further facilitated by the CBN cashless policy.

Optimization of value chains: Agricultural value chains in Nigeria are fragmented, leading to a lot of inefficiencies, high costs and bottlenecks along the food supply chain. With additional logistics hurdles caused by COVID-19 due to the restrictions of movement across different states in Nigeria, the value chains will have to undergo reinvention to eradicate these inefficiencies caused by the high level of fragmentation in the food supply chains.

Thus, the interesting fact is that in the post COVID-19 period in Nigeria, food production and consumption will still continue, agriculture will gain more attention from both federal and state governments as well as development partners, food supply chains and agriculture will be transformed. Policies will be directed at addressing any likelihood of shocks on food security and food crisis in Nigeria, international organizations and institutions will roll-out more agricultural programs to support farmers, agribusinesses and sustainable agricultural activities. Also, innovation will be geared towards e-marketing, food and input logistics as well as food storage and processing. **Immediately after COVID-19, food demand will be higher than supply because of the challenges farmers and agricultural value chain actors faced regarding farming and harvesting during the COVID-19 period and this will present an opportunity for aggregators of smallholder farmers produce as well as other actors along the value chains**⁸⁶.

The COVID-19 pandemic has further revealed the vulnerabilities in the Nigerian food supply chain, while this might be a cause to some, but it could also be seen as a blessing in disguise for some players in the food supply chain. During this pandemic, the food supply chain has been tested and strained, what is obvious is that it cannot guarantee Nigerians food security not only due to the disruptions caused by the pandemic but also as a result of the neglect it has suffered since the oil boom. **As a result of the COVID-19 pandemic, more people are getting apprehensive about the looming food crisis in Nigeria and this has led to the food supply chain gaining more attention from agricultural stakeholders including federal and state governments compared to pre-COVID-19 period.** In addition, various players along the food supply chain are thinking outside the box and adopting different innovative technologies to ensure smooth flow of food along the supply chain to final consumers in any part of the country and this has created more opportunities for creative and innovative thinkers in the food system. With these in mind, in the post COVID-19 period the Nigerian food supply chain would have undergone transformation with many innovative solutions to address some of the pre-existing vulnerabilities in the value chains.

⁸⁶ "COVID-19 Pandemic Impacts on Agricultural Value Chain" 21 Apr. 2020, <https://www.agricincome.com/covid19-pandemic-and-its-impact-on-food-security-agricultural-value-chain/>

11. Conclusion

It is going to be difficult to predict how the Nigerian food supply chains will continue to react during and after the COVID-19 pandemic. Although there have not been alarming cases of food shortages in Nigeria particularly due to the pandemic, but prior to COVID-19, it was already reported in November 2019 that there was an estimated 2.6 million people facing severe food insecurity in Adamawa, Borno and Yobe states in Nigeria⁸⁷.

One thing for sure is that in order to avert the looming food crisis and ensure food safety and security in Nigeria, the food supply chains will need to be further strengthened to navigate through this pandemic period and beyond as well as deal with the pre-existing vulnerabilities in the agricultural value chains in Nigeria. The goal now is to make sure that all the actors in the food supply chains in Nigeria are given priority to ensure that there is food on the table of every Nigerians at an affordable price. Notwithstanding that much attention has been on the medical and public health, but the agricultural value chains in Nigeria must now be tested and strained more than ever before. Thus, the food supply chain will adapt to the new changes because of the pandemic and adopt necessary innovative agricultural technologies to ensure food security in Nigeria both in the COVID-19 period and beyond.



⁸⁷ "Nigeria: FAO in Emergencies - Food and Agriculture" <http://www.fao.org/emergencies/countries/detail/en/c/213439>

What should Nigeria do to ensure sustainable food supply chains during and post COVID-19 period?

Our research findings and other agricultural experts' opinions suggest the following key actions and recommendations:

1. The agricultural policies in Nigeria should support the current situation of the already identified food insecurity in some parts of the country prior to COVID-19 combined with the impact of COVID-19 pandemic on food supply chains. Thus, every player along the agricultural value chains should be put into consideration.
2. Aggregators will need to bring or relocate their collection centres with high capacity closer to smallholder farmers to reduce the need for mobility of their farm produce.
3. In Nigeria, food should be treated as an essential service without being impeded by any movement restrictions to keep food moving and opening special procedures ('green channels') for food, trade and agricultural inputs to ensure food supply chains are kept open and functional during and beyond COVID-19 period.
4. The incorporation of necessary health and safety measures along the segments of the food supply chains in Nigeria should be a must for the actors.
5. Nigeria and other African countries need to review their trade and taxation policy options to create a free flow of food items in the continent, as such food will move freely from countries with surplus to deficit countries and thus creating a favourable food trade. This can be further facilitated with the speedy implementation of the African Continental Free Trade Area (AfCFTA) agreement by member countries.
6. The Nigerian government, both federal and states, should implement policies and programmes that will increase food production efficiency which can last beyond the COVID-19 pandemic period. Stockpiling food items will only address the challenges in the short term but not in the medium and long-term. The governments will need to increase their budgetary allocations to the agricultural sector and that will help to facilitate and improve the food supply chains in Nigeria.
7. In line with the recommendation of Maximo Torero, chief economist at the FAO, to manage food production properly, Nigeria needs to pay attention to the planting and harvesting calendar across the different regions/states in Nigeria.
8. The suppliers of agricultural inputs and fertilizers should be given priority to enable them to get to farmers on time during the planting season.
9. It is necessary to optimize the introduction and adoption of efficient and affordable innovative technologies along the food supply chains in Nigeria.
10. Nigerian smallholder farmers need to be further supported in order to enhance their productivity and marketing of their food produce through e-commerce channels. Smallholder farmers should be motivated and trained on how to leverage digital technologies to enhance market linkages, to enable them to overcome the temporary COVID-19 constraints and ensure better targeting and more effective service delivery in the post COVID-19 period.

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