Proceedings of the Annual Conference of the Agricultural Extension Society of Nigeria
Number: Twenty-Sixth Annual Conference
Theme: Redefining Agricultural Extension Practice to Cope with Emergencies
Date: 26-29, April 2021
Venue: Federal University of Agriculture, Abeokuta, Nigeria
ISSN: 1595 – 1421.http://aesonnigeria.org/ConfProc . **Email**: editorinchief@aesonnigeria.org

Impact of COVID-19 Pandemic on Agro-inputs Distribution in Ogun State, Nigeria

https://dx.doi.org/10.4314/jae.v26i1.5S

Oyediran Wasiu Oyeleke[1], Alaka Fatai Ayoade[2], Olutegbe Nathaniel Siji[3], and Ojo Oluwadamilola Mary[4]

[1]Department of Agricultural Extension and Rural Development, Federal University of Agriculture, Abeokuta, Ogun State, Nigeria
[2]Department of Agricultural Education, School of Secondary Education (Voc. & Tech. Programmes), Federal College of Education (Special), Oyo, Oyo State, Nigeria
[3]Department of Agricultural Extension and Rural Development, University of Ibadan, Oyo State, Nigeria
[4]Department of Agricultural Extension and Rural Development, Ladoke Akintola University, Ogbomoso, Oyo State, Nigeria. Email address: oyediran_wasiu@yahoo.com

Abstract
This study investigated the impact of the COVID-19 pandemic on agro-inputs distribution and sales along the agricultural supply chain (ASC) in Ogun State, Nigeria. A simple random sampling technique was used to select 96 agro-dealers from the Abeokuta and Ilaro ADP zones of Ogun State. Data were collected and analysed using a computer assisted personalized interviewing (CAPI) system. Findings showed that 89% of the respondents sold agro-inputs in the shops, 26% in the rural villages, and 19.8% at market stands. Due to the lockdown, 68.8% closed down shops for 35 – 39 days, 92.7% found it difficult to move agro-inputs from the stores to the villages, and 85.4% incurred high costs in transporting agro-inputs from urban to the rural areas. Likewise, 61.5% reported low patronage of fewer than 10 customers per week while the average weekly sales dropped from ₦60,000 to 15,600 for maize seeds, ₦78,000 to 27,000 for herbicides, and ₦336,000 to 120,000 for fertilizers. The lockdown was significantly affected patronage (β = 0.64) and sales (β = 0.72). The COVID-19 pandemic affected patronage and sales of agro-inputs in Ogun State.

Keywords: Agro-inputs, CAPI, COVID-19, lockdown, sales, supply chain, survey

Introduction
The sudden economic disruption caused by COVID-19 is not only destructive but also has spillover implications because it created demand and supply shocks in almost every area of human endeavour (El-Erian, 2020). Specifically, it resulted in a global economic slowdown, and affected trade, investment, growth, and employment. Also, it poses a serious health crisis, that governments throughout the world pronounced lockdown measures to prevent the spread of the virus. There is no doubting, therefore, the fact that the effect is apparent in every sector of the national and global economies. Agriculture is not left out of this problem. International efforts to control the virus by limiting human movement is inevitably causing economic

ISSN: 1595 – 1421.http://aesonnigeria.org/ConfProc . **Email**: editorinchief@aesonnigeria.org

shocks and social costs that have affected the functioning of agricultural and food system worldwide. There is an indirect effect of the pandemic on agricultural systems across the world (Larbode and IFPRI, 2020). As the crisis develops, these impacts have become more widely and deeply felt in the agricultural sector and global economies (Ivanov, 2020). Quarantine measures are severely affecting labour availability for key time-critical farming from sowing vegetable crops to picking fruits. Also, key players have lamented the difficulty in accessing agro-inputs during the pandemic in spite of its centrality to the food production and nutrition security of any nation. Agro-inputs consist of improved seeds, fertilizers, crop protection chemicals, machinery, and irrigation; these inputs are critical to successful agricultural production, productivity, and profitability.

In Nigeria, like other African nations, COVID-19 pandemic and associated business lockdown may have greatly limited agricultural supply chain and in particular agro-inputs transportation and distributions to rural farmers. This disruption to agro-inputs distribution has a far-reaching negative effect on agricultural productivity, therefore, calls for concerted actions. It would affect agronomic practices of the arable crops' farmers such as seed selection, planting time, fertilizer application, weeds, diseases, and pest control, and ultimately yield and food supply for the masses.

The need to avert the looming food crisis in Nigeria and ensure food security call for policies and stimulus packages for the agricultural supply chain actors who are also on the frontline of COVID-19 in ensuring food security. Supporting the stability and growth of the agricultural supply chain would foster food surplus, economic prosperity, and job creation in the rural areas; this is obvious to the Nigerian government. The last initiative on subsidized agro-inputs supply was in 2012 – 2014 planting seasons tagged "Growth Enhancement Scheme (GES)" and the impacts were felt by agro-dealers and farmers and in the nation's food production. The GES was launched as an e-Wallet system to distribute seeds and fertilizer subsidies directly to farmers through mobile money to prevent corruption and short-changes that had previously characterized the agricultural system in Nigeria (Oyediran *et al*., 2015). According to Adesina (2017), e-Wallet currently has 15 million subscribers, several million of whom are women farmers. Just like the past agricultural programmes in Nigeria, change in government however brought an end to the Agricultural Transformation Agenda (ATA) that cared for every actor in the agricultural value chain. The emergence of the COVID-19 pandemic worsened the Nigerian situation; the agricultural supply chain was broken. At present, prices of food and agricultural commodities have skyrocketed. For instance, the Poultry Farmers Association of Nigeria (PAN) has called on the federal government to lift the ban on the importation of maize into the country while virtually all the citizens are crying to the government to lift the ban on the importation of rice to cushion the effect

of shortfall in the local production and high cost of these food items. Agro-inputs are indispensable to the agricultural supply chain for agricultural growth and national development. The agricultural supply chain is however very broad; it is an economic system that distributes and apportions risks among actors in the supply chain.

Research questions

i. How long did it take agro-dealers to shut down their stores in compliance with the lockdown directives?
ii. What are the distribution channels and level of their functionality during a lockdown?
iii. How disruptive is lockdown to the movement of agro-inputs to the rural areas?
iv. What was the level of patronage and sales before and after the COVID-19 lockdown?
v. To what extent does COVID-19 affect patronage of agro-inputs and sales?

This study focused on specific objectives which include to:

i. estimate the number of days that agro-input shops were closed in compliance with the lockdown directives;
ii. identify the distribution channels and level of their functionality during lockdown;
iii. examine the impact of lockdown on distribution channels to the rural areas;
iv. estimate the patronage and sales before and during COVID-19 lockdown, and
v. determine if there is a significant relationship between the lockdown and patronage/sales

Methodology

Ogun State lies between the latitudes 6°54'35.4"N and longitude 3°15'30.11"E. It is situated within the tropics covering 16,409.29km^2 with a population of about 4,054,272 as at 2006 house-to-house National Population Census. Most of the crops grown in Ogun State include cassava, rice, maize, melon, cotton, cocoyam, cocoa, yam, cowpea, etc. Livestock production is supplementary. There are agro-dealers in every part of the state that serve as intermediaries between inputs suppliers and the rural farmers.

There are 135 and 153,785 registered agro-input suppliers and farmers in Ogun State during the 2013 growth enhancement support scheme. The registered agro-dealers comprise the National Agricultural Cooperative (NACO) and Ogun State Agricultural Inputs Dealers Association across the four ADP zones, Abeokuta, Ijebu-Ode, Ilaro, and Ikenne. Abeokuta and Ilaro zones were purposively selected

because of the high concentration of agro-dealers in the two zones (from the list obtained). The balloting method was adopted to randomly select ninety-six out of one hundred and ten agro-dealers from the two ADP zones, and this was used as a sample size.

The instrument used for the data collection is a structured interview schedule. Data were collected on respondents' perception of COVID-19, compliance with lockdown policy, and impact on distribution channels, patronage, and sales. Compliance with the lockdown directive was measured as the number of days the stores/warehouses were shut down. The impact on distribution channels was measured on a 3-rating scale as serious, mild, and no impact, while the mean scores were estimated. The actual number of customers and sales recorded before and during the pandemic was used for patronage and sales. These were analysed using to mean, percentages. The significant relationships between COVID-19 and patronage and sales were established through linear regression.
Respondents interviewed were above 40 years of age, most were married and have formal education. They have attended up to 5 workshops and training on agro-inputs supplies and operate on a medium scale.

Results and Discussion

Extent of Shutting Down Agro-Inputs' Stores in Compliance With Lockdown Policy

The result in Table 1 reveals that 68.8% did not open shops or go to markets for 35 – 39 days, 23.9% for 30 – 34 days, and few (7.3%) for more than 40 days. This is an indication that the agro-dealers complied with the government directive on lockdown despite the barrier it created on their enterprises and agro-inputs supply to the rural farmers. If the agro-inputs supply is not properly managed during and after COVID-19, the Nigerian agricultural supply chain would be severely affected (Agramondis, 2020).

Table 1: Extent of compliance with the lockdown directive

Stores & Warehouse shut down (days)	Percentages
30 – 34	23.9
35 – 39	68.8
More than 40	7.3

Source: Field Survey, 2020

Distribution Channels

The result in the Table 2 shows that 89% of the respondents used shops as a selling point, 19.8% have market stands while 26% hawk around the villages and

agricultural shows/events have the least (10.4%). It was however reported that 53.1% of the shops were functional, 14.6% market functional, and 12.5% functional at villages level during the lockdown. Displaying of agro-inputs at villages and market stands was however most affected by 87.5% and 85.4% respectively. Agricultural shows/events did not hold throughout the pandemic. Likewise, agro-inputs were usually conveyed to the rural farmers by roads through motorcycles (34.3%), peak-up van (52.1%), and buses (13.6%). But during the pandemic, 13.2%, 42.9%, and 13.6% of distributions by motorcycles, peak-up vans, and buses respectively were not functional. This is attributed to the government policy on lockdown aimed at curtailing the spread of the dreaded COVID-19. Nigerians were asked to stay at home while all commercial activities were completely locked down. Roads were blocked and there were too many checking points to enforce compliance. It can be deduced from these findings that the distribution of agro-inputs to the rural farmers by peak-up vans and buses is seriously affected.

Table 2: Channels used by the agro-dealers

Selling points	**Percentages**	**During Lockdown**
		Functional
Shops	89.0	53.1
Market stands	19.8	14.6
Agricultural shows/events	10.4	0.0
Hawking at the villages	26.0	12.5
Mode of distribution		
Motorcycles	34.3	21.1
Peak-up vans	52.1	9.2
Buses	13.6	1.5

Source: Field Survey, 2020. *multiple responses

Impacts of COVID-19 on The Distribution Channels

Table 3 shows that 60.4% of the respondents indicated serious impact for the reduction in the number of agro-inputs supplied to the agro-dealers by manufacturers due to logistics; 92.7% encountered difficulty in the movement of agro-inputs from the stores to the villages due to many checkpoints along the major roads; 80.2% reported extortion and unnecessary delay by the security personnel as a serious challenge, and 85.4% considered an increase in the cost of transporting agro-inputs to the rural areas as a major burden during the pandemic. The fear of attack by armed robbers due to low vehicular movement on the village roads was indicated as serious by 57.9%. Going by the mean scores, movement restriction **(**$\bar{x}$ = 2.93), extortion of agro-dealers **(**$\bar{x}$ = 2.73), and high cost transportation **(**$\bar{x}$ = 2.85) have serious negative impacts on the agro-input distribution. According to Adriano *et al*. (2020), complete lockdowns cause transportation delays and bottlenecks in the flow of goods and services, including in the agricultural sector.

ISSN: 1595 – 1421.http://aesonnigeria.org/ConfProc . **Email**: editorinchief@aesonnigeria.org

Table 3: COVID-19 impact on the distribution channels of agro-inputs

Impacts of COVID-19 on the distribution channels	Mean scores ($\bar{x}$)
Reduce in the quantity of agro-inputs supplied to the agro-dealers by manufactures due to logistics	2.50
Difficulty in the movement of agro-inputs from the stores to the villages due to many check points along the major roads	2.93
Extortion of agro-dealers and unnecessary delay by the security personnel	2.73
Fear of attack by armed robbers and kidnappers due to low vehicular movement on the village roads	2.33
Increase in the cost of transporting agro-inputs to the rural areas	2.85

Source: Field Survey, 2020.

Patronage of Agro-Input Suppliers

Table 4 shows that before the pandemic 41.7% of the respondents recorded weekly patronage of 21 – 30 customers, 33.3% have more than 30 customers' patronage, and 18.8% have 11 – 20 customers' patronage. On the other hand, patronage reported after pandemic by 61.5% was less than 10 customers per week and 27.1% recorded 11 – 20 patronage per week. These findings revealed a decline in the patronage of agro-inputs during the COVID-19 pandemic. Adriano *et al*. (2020) stated that during COVID-19, the restricting movement has created constraints to smallholder producers' access to the inputs required for the next growing season leading to concerns over decreased productivity. The implication of these findings has far-reaching negative effect on the nation's agriculture and economy. Firstly, there would be job losses because many agro-input shops and warehouses would become redundant, non-profitable, and out of business. Secondly, food produced would be drastically reduced and this could be heightened the already food and nutritional insecurity in the nation.

Table 4: Average patronage before and during pandemic

Number of customers per week	Before COVID-19	During COVID-19
	Percentage	Percentage
Less than 10	6.3	61.5
11 – 20	18.8	27.1
21 – 30	41.7	8.3
More than 30	33.3	3.1

Source: Field Survey, 2020

Proceedings of the Annual Conference of the Agricultural Extension Society of Nigeria
Number: Twenty-Sixth Annual Conference
Theme: Redefining Agricultural Extension Practice to Cope with Emergencies
Date: 26-29, April 2021
Venue: Federal University of Agriculture, Abeokuta, Nigeria
ISSN: 1595 – 1421.http://aesonnigeria.org/ConfProc . **Email**: editorinchief@aesonnigeria.org

Agro-Inputs Sales

Results show that maize seeds were sold for ₦350/kg before the pandemic but increased 450/kg during the pandemic. Also, the average unit price per litre of herbicides like uproot, paraquat, and force up went up from ₦1,400, ₦1,600 and ₦1,500 to ₦1,700, ₦1800, and ₦2,000 respectively. Urea fertilizer was sold for ₦8,000/bag before the pandemic and ₦10,000/bag during the pandemic. Likewise, average sales of maize seeds per week decreased from ₦60,000 to ₦15,600 during the pandemic. Sales of uproot, paraquat, and force up fell from ₦78,000, ₦67,200 and ₦90,000 to ₦27,000, ₦45,000, and ₦24,000 respectively. This implies that sales during lockdown were very low. This effect is very similar to that of Ebola Virus Disease (EVD) in which the restriction measures adopted to limit the spread of the EVD epidemic (closing of markets and borders) caused disruption in agricultural market chains and trade (FAO, 2016). A similar finding from China showed that roadblocks and checks prevented smallholder producers from selling products or buying inputs, which resulted in a loss of income, loss of productivity and it has potentially affected future cultivation seasons (Zhang, 2020).

Table 5: Average sales before and during the COVID-19 pandemic

Agro-inputs	Average Unit Price (₦)		Average Weekly Sales (₦)	
	Before Pandemic	During Pandemic	Before Pandemic	During pandemic
Maize seeds	350	450	60000	15600
Herbicides				
Uproot	1400	1700	78000	27000
Paraquat	1600	1800	67200	45000
Imeforce	1000	1500	36000	9000
Force up	1500	2000	90000	24000
Fertilizers				
Urea	8000	10000	336000	120000
NPK	10000	10000	300000	80000
Maxiforce (Litre)	2800	3100	22400	6200

Source: Field Survey, 2020

Relationship between Lockdown and Patronage

The coefficient of R^2 (0.407^{b}) in Table 6 indicates that the independent variable (lockdown) caused a 40.7% variation in the dependent variable (customers' patronage). The F-statistics (F = 64.483) is high and significant which supports the relationship between lockdown and patronage. A positive and significant relationship exists between lockdown ($\beta = 0.638^{d}$) and patronage can be explained that a 1% increase in the lockdown resulted in a 63.8% reduction in the patronage of agro-dealers. Therefore, lockdown affected patronage of agro-input suppliers in Ogun State, Nigeria. Lockdowns seriously affect the agricultural sector throughout the world (Adriano *et al*., 2020). Agramondis (2020) reported that the pandemic could

lead to a further food crisis in Nigeria as there is already food insecurity in some parts of the country.

Table 6: Relationship between the lockdown and patronage

Model	**R**	**R^2**	**Adjusted R^2**	**Std. Error of the Estimate**
1	0.638[a]	0.407	0.401	6.766
		ANOVA[b]		
	Sum of squares	**df**	**Mean Square**	**F-Statistics**
Regression	2952.289	1	2952.289	64.483
Residual	4303.669	94	45.784	
Total	7255.958	95		
		Coefficients		
Model	**Unstandardized Coefficients**		**Standardized Coefficients**	
	β	**Std. Error**	**Beta**	**T**
(constant)	45.337	7.047		6.434
Lockdown	1.578	0.196	0.638	8.030

Source: Field Survey (2020). [a] Predictor: (Constant), lockdown; [b] Dependent variable: patronage, [c] Predictor: (Constant), lockdown; [d] Predictor: (Constant), lockdown

Relationship between Lockdown and Sales

The coefficient of R^2 (0.401^b) in Table 7 shows that the independent variable (lockdown) caused a 40.1% variation in the dependent variable (average sales). The significant F-statistics (F = 98.367) is high which consolidates the relationship between lockdown and sales. It was revealed that the relationship between lockdown ($\beta = 0.715^d$) and sales were positive and significant. This means that a 1% increase in the lockdown led to a 71.5% reduction in the agro-inputs sales. Therefore, lockdown reduced sales of agro-input suppliers in Ogun State, Nigeria. FAO (2016) reported that epidemics often resulted in a breakup in the agricultural value chain and trading.

Proceedings of the Annual Conference of the Agricultural Extension Society of Nigeria
Number: Twenty-Sixth Annual Conference
Theme: Redefining Agricultural Extension Practice to Cope with Emergencies
Date: 26-29, April 2021
Venue: Federal University of Agriculture, Abeokuta, Nigeria
ISSN: 1595 – 1421.http://aesonnigeria.org/ConfProc . **Email**: editorinchief@aesonnigeria.org

Table 7: Relationship between the lockdown and sales

Model	R	R^2	Adjusted R^2	Std. Error of the Estimate	
1	0.715[a]	0.511	0.401	8454.298	
		ANOVA[b]			
	Sum of squares	**df**	**Mean Square**	**F-Statistics**	**Sig.**
Regression	7.031E9	1	7.031E9	98.367	0.000[a]
Residual	6.719E9	94	7.148E7		
Total	1.37510	95			
		Coefficients			
Model	**Unstandardized Coefficients**		**Standardized Coefficients**		
	β	**Std. Error**	**Beta**	**T**	**Sig.**
(constant)	49668.429	8805.006		5.641	0.000
Lockdown	2434.540	245.466	0.715	9.918	0.000[d]

Source: Field Survey (2020). [a] Predictor: (Constant), lockdown; [b] Dependent variable: sales, [c] Predictor: (Constant), lockdown; [d] Predictor: (Constant), lockdown

Conclusion and Recommendations

Distribution channels of agro-inputs were seriously affected by the COVID-19 pandemic. The customers' patronage and sales drastically reduced for the agro-dealers during the lockdown. Revitalization of previous agricultural policies (Growth Enhancement Scheme; Agricultural Transformation Agenda) that provide succor to the farmers and agro-dealers through subsidized agro-inputs becomes necessary. While advocacy for preventive measures is gaining momentum and compliance is enforced, the government should as well give a special waiver to the agro-dealers to supply inputs to the rural areas without any hindrances. Also, palliative from the governments should be extended to the agro-dealers to cushion the effect of poor sales.

References

Adesina, A. (2017). Agriculture as a Business: Approaching Agriculture as an Investment Opportunity, 15 February 2016. Retrieved from Foreign Affairs on January, 2021: https://www.foreignaffairs.com/sponsored/agriculture-business.

Adriano C., Azeta, C., Jun, H., May, H., Niclas, B., Verdiana, B. G., & Yahor, V., (2020). COVID-19 and Smallholder producers access to markets. FAO. 15th April 2020.

Agramondis, (2020). The impact of COVID-19 on Nigerian food supply chains. Agramondis Ltd. June, 2020. www.agramondis.com.

ISSN: 1595 – 1421.http://aesonnigeria.org/ConfProc . **Email**: editorinchief@aesonnigeria.org

Coalition Against COVID-19, (2020). Nigeria's private-sector response to COVID-19 ...." 15 Apr. 2020, https://businessday.ng/coronavirus/article/cacovid-nigerias-private-sector-response-to-covid-19/

European Union (2020). 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

Food and Agriculture Organisation of United Nations, (2016). Impact of the Ebola virus disease outbreak on market chains and trade of agricultural products in West Africa. Dakar (also available at http://www.fao.org/3/a-i5641e.pdf).

Federal Government of Nigeria (FGN), (2020). Covid-19: Federal Government of Nigeria announces fiscal ...." 6th April 2020, https://pwcnigeria.typepad.com/tax_matters_nigeria/2020/04/covid-19-federal-government-of-nigeria-announces-fiscal-stimulus-measures.html

Ivanov, D. (2020). Predicting the impacts of epidemic outbreaks on global supply chains: a simulation-based analysis on the coronavirus outbreak (COVID-19/SARS-CoV-2) case. *Transportation Research Part E*.: *Logistic and Transportation Review,* 136:101922. https://doi.org/10.1016/j.tre.2020.101922

Laborde, D., & International Food Policy Research Institute Food Export Restrictions during the Covid-19 crisis. (2020). https://public.tableau.com/profile/laborde6680#!/vizhome/ExportRestrictionsTracker/FoodExportRestrictionsTracker;

Zhang, H. (2020). What is the impact of the coronavirus epidemic on agriculture and rural economy? Sohu. Available at https://www.sohu.com/a/376900526_100006058.