Research Article

Statistics of Rice Farming Activities During COVID-19 Pandemic Lockdown: The Case of Niger State, Nigeria

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Abstract | The impact of the infamous 2019 pandemic on agriculture has in most cases been generalized. However, the impacts affected sectors and subsectors differently which would advocate different approach to the challenges faced. The main objective of this study is to highlight how the COVID-19 pandemic lockdown affected the activities of the rice farmers, the rice supply chain to find out if the general view of the impact from literatures is similar or different and then propose pro-active measures/strategies to mitigating shocks against any future outbreak. Data were collected from over 300 households which include about 165 rice farmers. All the rice farmers are male, with an average age of 34 years with majority 87% reside in rural areas. Most of the farmers are aware of the existence and dangers of COVID-19. Although there was considerable free movement of rural farmers to access their farms, inputs especially fertilizer has been the major constraints to production. More so, most farmers were only able to sell 1-20% of their paddy rice during the period. Evidence suggest that majority of the rice farmers remain optimistic despite the disruption caused by COVID-19 as over half of the farmers (61%) experienced moderate price of their produce compared to pre-COVID-19 period, 31% were offered higher while only 8% of the farmers reported lower prices. Other interesting finding are highlighted in and proactive recommendations provided against any similar crisis.

Introduction

Nigeria and the world at large are dealing with an evasive and seemly an invisible disease which its end is yet unknown even with the existence of its vaccine. COVID-19, the evasive disease emerged from China in late 2019 and spread to over 180 countries in just three months, forcing countries to impose nationwide lockdown (WHO, 2020). Nationwide lockdown was imposed in Nigeria by the president on 27th April 2020 following the increasing number of cases. Infections/cases were more in the urban areas than the rural (Delamater *et al.*, 2019; Souch and Cossman, 2020), hence, government imposed stringent restrictions of movements in the urban areas.

The immediate consequence of the lockdown was the imbalance created between demand and supply of food. On one hand, farmers have little or no access to input (Esiobu, 2020) and the price of the few available were absurd; farmers who choose to continue farming are faced with high cost of production which in turn leads to increase price of produce. On the other hand, the average income of consumers declined due to loss of jobs (Farayibi and Asongu, 2020) or cut in income leading to low purchasing power and less patronage of farmers' produce. This study attempts to provide answers to how COVID-19 affected the activities of a subsector (rice). The following research questions is established for the study: are the challenges stipulated by other studies in other subsectors in any form relate to the challenges faced in the rice subsector? Which of the rice production activities is/are mostly affected by pandemic?

The impact of COVID-19 pandemic on agriculture sector in most studies have been generalized despite the different challenges faced in each subsector. Rice is one of the staple foods in Nigeria and its production in the study area Niger State is a common farming activity by rural resident, providing food, income, high socioeconomic status to majority of the farmers and the actors in its value chain. Majority of the rice farmers' production activities are highly weather dependent, thus, a slight delay that can be caused by the lockdown can result to huge losses thereby posing threat to food security. Hence, it is paramount to investigate any disruptions to the activities of the farmers on any crisis scenario such as the contemporary COVID-19 in order to prevent loses. To answer the research questions, the following objectives set.

Objectives of the study
- Determine the awareness of the farmers
- Identify the pre-harvest activities that are most affected by the pandemic
- Identify the post-harvest activities that are most affected by the pandemic
- Recommend proactive measures base on empirical evidence from the study and previous literatures.

This study therefore takes the advantage of highlighting how the pandemic impacted the activities of rice production given it importance to food security to suggest key aspects to which disruptions to food production can be eliminated or minimized for

policy makers. Given spread of the recent coronavirus Omicron variant, this research becomes helpful in policy making, implementation and adoption.

Materials and Methods

Study area
The study area is Niger State of Nigeria. It is the State with the largest land area (4240 Km²) in the country with a population of about 5,556,200 (Niger State Bureau of Statistics, 2016). Majority of citizens in the State are farmers who are into diverse crop cultivation and rearing livestock. Niger State is well known for rice production due to the ecological advantages that supports rice production, producing about 16% of the total rice production in the country. The State is comprised of three (3) ecological zones and every local government area in each zone have the potential for producing a world competitive yield.

Figure 1: *Map of Niger State and the surveyed areas.*

Data collection and analysis
Primary data used for this study was collected by the department of Agricultural Economics and Extension Services (AEES) of Ibrahim Badamasi Babangida University (IBBU), Lapai, Niger State, Nigeria. The data were collected during and immediately after COVID-19 lockdown. All Nigeria Central for Disease Control (NCDC) safety protocols were followed in detail during the survey for the safety of respondents, enumerators and researchers as well. A simple random sampling technique was used in the selection of household respondents after which rice farmers were extracted from the sample. Structured questionnaire (online 90% and paper 10%) was utilized to interview the respondents. The online questionnaire was used to reduce the risk of spreading

infection which is higher with the use of paper questionnaire. In total, about 165 rice farmers were interviewed from seven (7) local government areas in the three (3) ecological zones of the State including Zone 1: Agaie, Bida, Katcha and Lapai; Zone 2: Rafi; and Zone 3: Borgu and Kontagora local government area (Figure 1). The analysis of data in this study includes descriptive statistics cross referencing related literatures that support or contradicts the findings in this study.

Results and Discussion

Awareness of the farmers

During the survey period, majority of the farmers (96.4%) were already aware of the danger of COVID-19. About 65% of the farmers know someone (close or distance) who has been infected by the virus. So, it was no longer the issue of believing the virus exist or not but rather the coping mechanism to pass through the crisis alive and in good health. They were asked how often they wear face mask and their responses is shown in Figure 2 below.
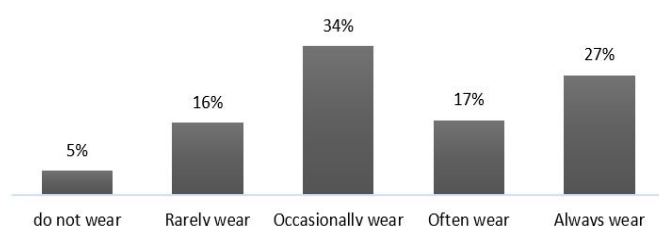

Figure 2: *Response of rice farmers on the use of facemask.*

Majority of the farmers adhered to wearing of face mask but about 16% and 5% of the farmers reported rarely wearing facemask and not wearing respectively. Despite those staggering cases in the country, there were farmers (8%) who believe that only elites and the rich can be infected and not the rural dwellers. The socioeconomic characteristics of the rice farmers is presented in Table 1.

Socioeconomics characteristics of the farmers

The mean age of the rice farmers is about 35 years indicating the dominance of young farmers. The respondents are all male and most of them (67%) are married. On average, the farmers have attained 12 years of formal education (primary school). About 72.5% of the farmers' only source of income is from farming. Other sources of income in combination with farming (28.5%) include daily wages, skilled self-employed, professional self-employed and salary

earners. Few of the farmers (about 13%) reside in urban region. As majority of the farmland of the farmers (about 98%) are in the rural area, the farmers in urban areas were hit more during the lockdown because restriction was tighter in the cities as a result of rising cases of infected. Only about 2% of the farmers residing in urban area have their farm in the locality, the remaining 11% farmers had little or no access to their farm located in the rural area.

Table 1: *Socioeconomic characteristics of the rice farmers.*

Category		
Age	Mean	34.5
	Max	70
	Min	18
Gender	Male	100%
	Female	Nil
Marital status	Single	32%
	Married	67%
	Widower	1%
Household size	Mean	11
	Max	25
	Min	1
Years of education	Mean	11.8
	Max	20
	Min	3
Residency	Rural	86.7%
	Urban	13.3%
Source of income	Only farming	71.5%
	Farm and others	28.5%

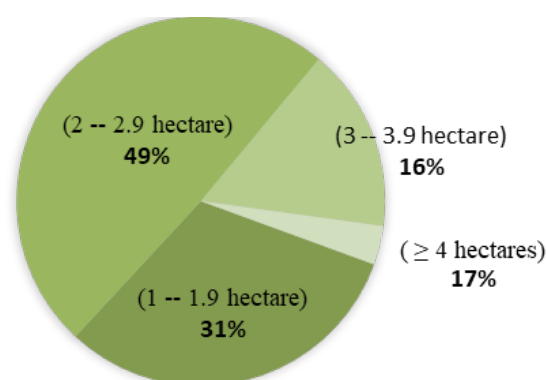*Source: author's calculation from survey data 2020/2021.*

Figure 3: *Farm size for rice.*

Figure 3 describe the percentage of farm sizes dedicated to rice farming. The rice farmers practice small and medium scale rice farming. Some of the farmers also have separate farmland for different crops such as maize, cowpea, millet, yam, cassava, groundnut and sorghum but their major crop is rice. This subsistence

level multi-crop farming system practiced by the farmers has in more ways helped them in absorbing some of the shocks caused by COVID-19.

Statistics of rice farming activities during COVID-19 lockdown

The restriction on lockdown did not affect most farmers especially those in rural area as over 84% were able to access their farm. Although there was no restriction to movement of agricultural inputs as required by the government, farmers still find it difficult in access some input especially fertilizer. Majority of the farmers (about 89%) were in the mid stage of rice farming activity where critical input such as fertilizer determines the yield. The problem of availability of fertilizer has been in existence (Ahmed et al., 2017) long before COVID-19. Compared to other regions in the world disruption was more of logistic issues eminently caused by the pandemic (Ilesanmi et al., 2021; Arouna et al., 2020).

Table 2: *Rice farming activities and challenges during lockdown.*

	Pre-harvest			Post-harvest	
	Category	Response		Category	Response
Crops	Rice only	72%	Buyers approach	Yes	51.7%
	Rice and other	28%		No	48.3%
Farm location	Rural	98.2%	Buyer category	Consumer	27.6%
	Urban	1.8%		Retailer	8%
Access to farm	Yes	84.2%		Wholesaler	64.4%
	No	15.8%	Buyers' price	Low	8%
Difficulty to access inputs	Labor	2.4%		Moderate	60.7%
	Fertilizer	92.7%		High	31.3%
	Herbicide	4.9%	Percentage sold	1 – 20%	91.2%
	Pesticide	2.4%		21 – 40%	3.1%
Current activity	Not started	0.6%		41 – 60%	4.4%
	Early stage	0.6%		61 – 80%	0.6%
	Mid stage	88.5%		81 – 100%	0.6%
	Harvest stage	7.9%			
	Selling stage	2.4%			

Source: author's calculation from survey data 2020/2021.

Table 2 presents the percentage of the farmers with respect to the challenges faced during lockdown. About 52% of the farmers reported being approached by buyers on the availability of their produce 28% of

them were direct consumers, 8% retailers and about 64% wholesalers. FAO Food Price Monitoring and Analysis Tool (FPMA) 12 reported increase of staple food prices in March 2020 in several countries due to COVID-19. Similarly, the price of rice both paddy and milled rice was affected in the study area. About 31% of the farmers reported selling produce at higher prices, 61% at moderate price and just 8% at low price compared to previous sale before the pandemic. Unsold crops required storage which does not come cheap thereby increasing the cost of production, coupled with low purchasing power of consumers were some of the challenges faced by the farmers in the study area.

Evidence suggest that majority of the rice farmers remain optimistic despite the disruption caused by COVID-19. About 48.5% of the farmers are willing to increase the size of their rice farm for the next farming season, 28.5% wishing to maintain the same farm size. One of the reasons to this optimism was the favorable price of produce the farmers experienced during the lockdown. Another factor was that most of the farmers reside in the rural area where restriction was not as tight as the urbans' hence, farmers were able to partially access and, in some cases complete access their farms. Only 8.5% and 13.3% wishes to reduce crop land and pause rice farming respectively until things get better. Some (1.2%) thought of switching to another crop instead.

To further expatiate, this paper test for the null hypothesis that says the mean difference between the pre-harvest and post-harvest challenges faced by the farmers during the COVID-19 lockdown is equal to zero ($H_0 = 0$), while the alternative hypothesis (H_1) states that the mean difference between the pre-harvest and post-harvest challenges faced is different from zero.

Table 3: *t–Test comparing mean of the difficulties faced.*

Variables	Obs	Mean	Std. Err.	Std. Dev.
Pre-harvest	165	0.157576	0.02845	0.365452
Post-harvest	165	0.909091	0.022448	0.288355
difference		-0.75152	0.03624	
t-value = -20.737 95% confidence interval				
Satterthwaite's degrees of freedom = 311.164 H_0 difference = 0				
H_1: difference ≠ 0 (p-value = 0.0000)				
H_1: difference < 0 (p-value = 0.0000)				

Source: author's calculation from survey data 2020/2021.

As seen in Table 3, the p-value is negative and indicates a reverse direction of the effect between the compared means has no bearing on the significance between the means. The two-tail p-value is smaller than the level of significance which is enough evidence to reject the null hypothesis and to conclude that there is significant difference in the hardship faced between the pre-harvest and post-harvest farming activities. The table also shows that on the one-sided H_1 [difference less than zero (p-value = 0.0000)] reveals that the challenges faced by the farmers was more pronounced in the post-harvest activities than the pre-harvest activities. The challenges faced were coupled with fact that the market for their product declined due to low purchasing power of major customers.

Conclusions and Recommendations

The study found that majority of the farmers were aware of the danger of COVID-19 and adhered to safety measures this has been the effect of the existing grassroot administrative system. The farming activities mostly affected by the emergence of COVID-19 on the pre-harvest activities is the access to inputs while on the post-harvest activities is the marketing of produce. Although there was considerable free movement of farmers to access their farms but inputs availability (especially fertilizer and labor) and marketing channels remained a constraint to production. The farmers enjoyed moderate and higher prices compared to pre-COVID-19 era even though majority of them only sold about 20% of their produce. The farmers also complained on the cost of storage as most of their produce remained unsold due to low patronage. Though the impact of the pandemic on rice farming activities is similar to other sectors in some countries, the intensity of the impact is much lesser in the study area.

Sequel to the above observations, the study recommends prompt orienting and adherence to safety protocols to safeguard farmers and laborers as well as production sanitary measures be prioritized in any outbreaks; this can be achieved by improve dissemination and feedback of relevant information to and from remote areas. Unrestricted movement of essential inputs and agricultural produce is not enough, availability of these input for farmers to access should be observed. Introduction of small simple farm machines such as planter, harvester and so on to reduce high dependency on manual labour during labour deficit periods. Agriculture credit/financial support services will go a long way to help in the affordability of these input by the poor farmers who are the majority. The credit should be in form of physical input rather than cash as this will encourage smooth production activities rather than individual facing logistic challenges in provision of inputs. To ease the storage cost, local administrative authorities can purchase from farmers during bumper harvest or low patronage to encourage.

Acknowledgements

Novelty Statement

The implications of this empirical study highlights details of rice farmers experience during the COVID-19 lockdown which were in other literature generalized. Therefore, this study providing panacea based on specific location targeting specific farmers and specific crop for precision policy making.

Conflict of interest
The author has declared no conflict of interest.

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