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EFFECTS OF COVID-19 ON THE FOOD SECURITY STATUS OF RURAL FARMING HOUSEHOLDS. EVIDENCE FROM NIGERIA

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Abstract: For the past couple of decades, food insecurity has become a major global phenomenon, which makes zero hunger the second Sustainable Development Goal. Nevertheless, COVID-19 has set in and posed a serious threat to the food system. Thus, there is a need to assess its effect on food security. This study, therefore, examined the effects of COVID-19 on the food security of rural farming households in Enugu State, Nigeria. Data collected from 120 households were analysed using descriptive statistics, the food security index, and logistic regression. The results revealed that the majority (64.5%) of the households with a shortfall index of 0.313 were food insecure, while only 35.5% were food secure with a surplus index of 0.109. The average daily equivalent calorie consumption of adults in food insecure and food secure households was 1552.52 and 2506.88 kcal, respectively. Low food availability (p<0.01), an increase in food prices (p<0.01), and the inability to harvest crops (p<0.1) increased the probability of food insecurity. Thus, the COVID-19 pandemic, due to the imposed lockdown has affected household food security. In contrast, access to credit (p<0.01), education (p<0.1), cooperative memberships (p<0.01), and income (p<0.05) positively influenced food security status. Reducing rational consumption, eating less expensive food, skipping meals, borrowing money to buy food, allowing children to eat first, and engaging in additional small-scale productivity activities were the major food insecurity coping strategies adopted by households during COVID-19. The study recommends the provision of farm inputs and financial support to farmers by governments and NGOs to curb the adverse effects of COVID-19 on food security.

Key words: COVID-19, food insecurity, rural households, smallholder farmers, coping strategies.

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Introduction

For the past couple of decades, food insecurity has been one of the major global phenomena. It is highly concentrated in developing nations, particularly in sub-Saharan Africa (SSA). The problem of malnutrition keeps increasing in SSA, as the number of undernourished people was reported to have increased by 32 million people between 2015 and 2019, making the number of undernourished people in SSA 239.1 million (FAO, IFAD, UNICEF, WFP, and WHO, 2020). Rural dwellers, who are mostly farmers, were the hardest hit in terms of malnutrition and poverty (Global Hunger Index, 2019; World Bank, 2019). In Nigeria, food insecurity was reported to be more concentrated among the rural population (Nigeria Millennium Development Goals End-Point Report, 2015).

Currently, about 690 million people, or 8.9% of the world's population, are undernourished globally (FAO, IFAD, UNICEF, WFP, and WHO, 2020). World food insecurity increased by 60 million (8.7%) between 2014 and 2019 (FAO, IFAD, UNICEF, WFP, and WHO, 2020). This shows that food insecurity is on the rise globally. In Africa, the number of undernourished people keeps increasing. Between 2014 and 2019, food insecurity in Africa increased by 17.6 per cent (FAO, IFAD, UNICEF, WFP, and WHO, 2020). Currently, 19.1% of the population (over 250 million people) is undernourished.

Globally, several programmes have been targeted at alleviating the high rate of food insecurity. For instance, the member states of the United Nations agreed to work towards halving the number of people suffering from hunger by 2015 and achieving seven Millennium Development Goals (MDGs). However, this was not met, although tremendous progress was recorded as the world's percentage of hungry people declined from 23.3% in 1990–1992 to 12.9% in 2014–2016 (Millennium and Goals, 2015). Nigeria is part of this phenomenon, as the country was unable to reduce the number of hungry people by half in 2015. This implies that food insecurity remains a major global concern and that a lot of effort has to be put in place to reduce the level of food insecurity (Mukaila et al., 2020; Falola et al., 2023).

In 2015, following the MDGs, the United Nations Development Programme (UNDP) committed to 17 Sustainable Development Goals (SDGs), including the issue of food insecurity. Zero hunger by 2030 was the second SDG; this shows how serious the challenge of food insecurity is for world leaders. The target of the second SDG was to improve nutrition, achieve food security, and end hunger. Efforts have been made by governments, UNDP, and other agencies to achieve zero hunger by 2030. Nevertheless, COVID-19 has set in and posed a serious threat to the food system. This could affect achieving SDG 2 by 2030.

The immediate preventive measures such as lockdown, border closure, and movement restrictions established globally to contain the spread of COVID-19

created serious hindrances to agri-food systems, economic activity, and, consequently, nutrition, food security, and people's livelihoods (FAO, 2021). Furthermore, farmers were negatively affected as they were unable to buy inputs and sell their products, disrupting the national and international food supply chain and the entire food system (Andam et al., 2020; Amare et al., 2020; Chiemela et al., 2021; NAERLS and FMARD, 2020). The pandemic results in reductions in labour availability and an increase in food prices due to its effects on the food supply chain (Egwue et al., 2020; Swinnen, 2020). The pandemic also resulted in a decline in agricultural productivity and consequently a reduction in farmers' earnings, which could affect the food security of their households.

Most studies on the recent COVID-19 in Nigeria have tended to focus on the economy, education, health, and industrial sectors (Abdullahi et al., 2020; Ajibo, 2020; Gabriel et al., 2020; Hassan et al., 2020; Jacob et al., 2020; Nnabuife et al., 2020; Obayori et al., 2020; Ololo et al., 2020; Onyekwena and Ekeruche, 2020). However, there is little research on how COVID-19 affects household food security, especially in rural farming households, and how they cope with the situation of food insecurity during the pandemic. This raises the need to assess the effect of COVID-19 on household food security. This study, therefore, investigated the food security status of rural farming households and the effects of COVID-19 on their food security status. It also analysed the coping strategies of farming households in relation to food insecurity during the COVID-19 crisis. This was to find out how they survived the crisis and whether or not they adopted a healthy coping strategy. This would enable appropriate policy interventions to curb the effects of COVID-19 on the food security of farming households.

Material and Methods

The study area

The study area was Enugu State, one of the thirty-six states of Nigeria. It is bordered by Ebonyi State to the east, Benue State to the northeast, Abia and Imo States to the south, Anambra State to the west, and Kogi State to the northwest. The state has a population of 3,257,298 people (National Population Commission, 2006), with an annual population growth rate of 2.3%, and occupies an area of 71,161 square kilometres. About eighty-five per cent of the population resides in rural areas, and seventy-five per cent of the rural dwellers are engaged in agriculture and allied activities (Ezike, 1998; Obetta et al., 2020). The state is located at latitudes $5^0$55'N and $7^0$08'N of the equator and longitudes $6^0$55' E and $7^0$08' E of the Greenwich meridian (Mukaila et al., 2022). It has seventeen local government areas (LGAs), which were grouped into six agricultural zones based on agroecology.

Sampling technique and data collection

Sampling of the farming households was done using a multistage sampling technique. A random selection method was used because the majority of the rural population in Enugu State are farmers. Thus, three LGAs were randomly selected in the first stage. The second stage involved the random selection of two rural communities, making a total of six rural communities. The third stage of the sampling techniques involved a random selection of twenty households from each community. This resulted in a total number of 120 farming households that served as respondents in the study.

The population for this study consisted of rural farming households. Primary data collected through the use of structured questionnaires was used in this study. The data collected contained information on the socioeconomic characteristics of the farming households, the food consumed by the households in the last twenty-four hours, the impact of the COVID-19 pandemic on their food security, and how they coped with the situation. The data were collected after the ease of lockdown in Nigeria. The researchers observed COVID-19 preventive measures such as social distancing, and the use of nose masks, hand gloves, and hand sanitisers to ensure the safety of researchers and respondents.

Data analysis

Descriptive statistics (such as mean, percentage, and frequency), the food security index, and logistic regression were used to analyse the data collected. Descriptive statistics were used to describe the socioeconomic characteristics of rural household heads.

This study used the food security index to measure the food security of the farming households following Babatunde et al. (2007), Mukaila et al. (2020), Omotesho et al. (2006), and Yusuf et al. (2015). The recommended calorie intake of 2260 kilocalories (kcal) per adult equivalent per day by the FAO was used as the food security line. The daily per capita calorie intake was determined by dividing the estimated daily calorie consumption of the household by the household size measured in adult equivalent with the use of male adult scale weights. The calories available in food items were estimated using food nutrient composition. A household with a daily per capita calorie consumption of up to 2260 kcal was considered food secure. Those whose household members consumed less than 2260 kcal per capita per day were considered food insecure.

The food security index is expressed as follows:

$$Z = \frac{I}{R} \tag{1}$$

where Z is the food security index, I is the daily per capita calorie intake of the household and R is the daily per capita calorie requirement of the household.

The headcount ratio (HR) is a measure of food security status and it is defined as

$$HR = \frac{M}{N} \quad (2)$$

where M is the total number of the food-secure and N is the sample population.

The food insecurity gap (FIG_i) was used to measure the depth of food insecurity among rural households. It is expressed as:

$$FIG_i = \frac{TR_i - TC_i}{TR_i} \quad (3)$$

The total food insecurity gap or shortfall index is expressed as:

$$TFIG_i = \frac{\sum(TR_i - TC_i)}{TR_i} \quad (4)$$

The squared food insecurity gap was used to examine the severity of food insecurity among food-insecure households. It is expressed as:

$$SFIG = \frac{\sum(FIG_i)^2}{M} \quad (5)$$

where TC_i is the total calorie consumed by the i^{th} food-insecure household, TR_i is the total calorie required for the i^{th} food-insecure household and $\sum$ is the summation.

Logistic regression was used to investigate the factors that affected farming household food security, and some variables were incorporated into the model to measure the effects of COVID-19 on farming household food security. Logistic regression is a predictive model that can perfectly account for dichotomous dependent variables. Therefore, it has been widely used in food security studies (Babatunde et al., 2007; Mukaila et al., 2020; Omotesho et al., 2006; Salau et al., 2019). It is explicitly represented as:

$$Y = \beta_0 + \beta_1 LFA + \beta_2 IFP + \beta_3 IHC + \beta_4 LO + \beta_5 ED + \beta_6 MO + \beta_7 FE + \beta_8 HS + \beta_9 CM + \beta_{10} IN + \beta_{11} EXT + \beta_{12} AC + \varepsilon \quad (6)$$

where Y is the food security status, LFA is the low food availability, IFP is the increase in food prices, IHC is the inability to harvest the crop, LO is the low output, ED is the educational level, MO is the major occupation, FE is farming experience, HS is the household size, CM is cooperative membership, IN is he income, EXT is the access to extension, AC is the access to credit, β_{1-12} are the coefficients of the regressors and ε is the error term.

Table 1. Description of the variables.

Variable name	Description	Expected sign	Unit of measurement
Food security status	A household with 2260 kcal per capita consumption was considered food secure and coded 1, 0 if otherwise		2260 kcal per capita (adult equivalent) consumption per day
Low food availability	This was measured in terms of the low availability of foodstuff in the household as farmers were unable to engage in their normal activities. 1 if low food availability affects their food consumption, 0 if otherwise	-	Dummy
Increase in food prices	This was measured in terms of high food prices during the pandemic. 1 if an increase in food prices affects the household food consumption, 0 if otherwise	-	Dummy
Inability to harvest crop	Measured in the form of movement restrictions imposed by COVID-19 which affects farmers' ability to harvest their products. 1 if farmers' inability to harvest their crops affects their food consumption, and 0 if otherwise	-	Dummy
Low output	Measured in the form of the effects of COVID-19 on farmers' output. 1 if low output affects their food consumption, 0 if otherwise	-	Dummy
Education	The educational level of the household head	+	Years
Major occupation	1 if farming is the major occupation, 0 if otherwise	+ / -	Dummy
Farming experience	Years of farming experience of the household heads	+	Years
Household size	The number of persons living in the same household and eating together.	+/-	Adult equivalent
Cooperative membership	Membership of the household head in a cooperative. 1 if the household head belongs to a cooperative, 0 if otherwise	+	Dummy
Income	Monthly income of the household head	+	Naira
Access to extension services	Access to agricultural extension services by farmers in the previous farming season	+	Number of contacts
Access to credit	Access to credit facilities from formal and informal sources. 1 if a household head has access to credit, 0 if otherwise	+	Dummy

Source: Authors' computation.

Gujarati (2004) and Greene (2005) suggested the derivation of the marginal effects of the explanatory variables in the logistics regression model. This should enable a comprehensive interpretation of the coefficient of the logistic regression model. Therefore, the marginal values of the explanatory variables were estimated to show their predictive power.

A three-point Likert rating scale was employed to examine the food insecurity coping strategies adopted by rural households during the COVID-19 crisis. The three-point Likert scale ranged from always (3), occasionally (2), to never (1). The mean value ($\bar{x}$ = 2) of the three values was used as the cut-point. The mean value of the smallholder households was calculated for each of the coping strategies listed. All the mean scores equal to or greater than 2 were regarded as widely adopted coping strategies during the pandemic, and all scores less than 2 were considered less adopted.

Results and Discussion

Socioeconomic characteristics of the farmers

The socioeconomic characteristics of the rural farmers are presented in Table 2. The results reveal that the majority of the farming household heads were male (90.8%). This implies that the males were likely to be responsible for the needs and wellbeing of the household and had the responsibility of providing food for the household. The majority were married (86.7%) and the average household size was six persons. However, rural households prefer a large household size, which could serve as a family labour force for their farming activities (Mukaila et al., 2021). The rural farming household heads had an average age of 52 years. This shows that although the household heads were elderly, they were still economically active enough to carry out farming activities effectively. Forty per cent of the farmers had no formal education. However, the majority possessed some level of education, though not advanced, which could help them in the decision-making process. This is because the level of farmers' education can enhance their ability to make the right decision on the use of inputs, which in turn increases their productivity (Akanbi et al., 2022; Falola et al., 2022). A larger percentage (68.3%) of the rural household heads did not belong to a cooperative society where they could benefit from economies of scale and have access to relevant agricultural information. This could affect their access to credit, as one of the major roles of a cooperative society is the provision of financial support to its members.

Farming is the major occupation of 85 per cent of rural household heads. This implies that agriculture serves as a means of livelihood and a source of income for the rural population. Thus, any disruption to agricultural activities would affect the livelihoods of the rural population. The rural household heads had an average

farming experience of 21 years. This implies that they were experienced farmers who had knowledge of farming activities.

Table 2. Socioeconomic characteristics of the smallholder farmers.

Characteristics	Categories	Frequency	Percentage	Mean
Gender	Male	109	90.8	
	Female	11	9.2	
Age	Less than 40	11	9.2	52
	41 to 50	32	26.6	
	51 to 60	65	54.2	
	Above 60	12	10	
Marital status	Married	104	86.7	
	Single	5	4.2	
	Widow(er)	11	9.2	
Household size	Less than 4	23	19.2	6
	5 to 8	86	71.7	
	Above 8	11	6.7	
Educational status	No formal education	48	40	
	Primary education	40	33.3	
	Secondary education	26	21.7	
	Tertiary education	6	5	
Cooperative association	Non-member	82	68.3	
	Member	38	31.6	
Major occupation	Farming	102	85	
	Artisan	8	6.7	
	Business	6	5	
	Civil servant	4	3.3	
Farming experience (years)	Less than 10	28	23.3	21
	11 to 20	34	28.3	
	21 to 30	27	22.5	
	Above 30	31	25.8	
Access to extension services	Yes	39	32.5	
	No	81	67.5	
Farm size (hectares)	Less than 2	103	85.8	1.8
	2 to 3	14	11.7	
	Above 3	3	2.5	
Access to credit	Yes	43	35.8	
	No	77	64.2	
Monthly income (₦)	< 20,000	45	17.5	26,333.3
	20,001 to 40,000	56	55	
	40,001 to 60,000	15	20.8	
	> 60,000	4	6.7	

Source: Field survey, 2020.

They had an average farm size of 1.8 hectares, which implies that they were smallholder farmers. Access to agricultural extension services (32.5%) was very low among the smallholder farmers. The low access to extension services could

negatively affect their productivity as extension agents disseminate useful information to farmers. In the same vein, only 35.8% had access to credit. This could affect the level of their agricultural investments and could be the reason why they operate on a small scale. The smallholder farmers had an average monthly income of ₦26,333.3 (USD 63.99). However, this was low for a household with an average of six people. The low income was due to the impact of the COVID-19 pandemic on their production activities, as farmers stated during the field survey that the COVID-19 crisis negatively affected their income. A study conducted by UNDP (2020a) also reported that the income-generating capacity of farmers and food system agents was adversely affected due to the pandemic.

Food security status of rural farming households during the pandemic

Table 3 presents the results of the food security indices. The results show that the majority (64.5%) of the rural farming households were food insecure, while only 35.5% were food secure. The headcount ratio for food-insecure households was 0.645 and 0.355 for food-secure households, which implies that about two-thirds of the sampled population was food insecure. The daily per capita calorie intake of food-insecure and food-secure farming households was 1552.52 kcal and 2506.88 kcal, respectively. Thus, food-insecure households fell short of calorie requirements by 31.3 per cent while food-secure households had a surplus of calorie requirements by 10.9 per cent. The severity of food insecurity among food-insecure households was 0.098. These results imply that food insecurity is a serious challenge for rural households during the COVID-19 pandemic. This suggests that the COVID-19 pandemic has disrupted rural households' food consumption and increased rural farming households' food insecurity. This supports the opinion of FAO (2020a) that COVID-19 has led to an increase in hunger globally. It is worth noting that the pandemic, as a result of lockdown and movement restrictions, led to low household food availability, an increase in food prices, the inability of farmers to harvest their crops, and low crop output as their agricultural activities were disrupted. These consequently affected the food consumption of rural households.

Table 3. Results of rural farming household food security indices.

Food security indices	Food insecure	Food secure
Percentage of rural households	64.5	35.5
Headcount ratio	0.645	0.355
Per capita calories available per day	1552.52	2506.88
Squared food-insecure gap	0.098	
Shortfall/surplus index	0.313	0.109

Source: Field survey, 2020.

Effects of COVID-19 on the food security status of rural farming households

Table 4 presents the result of the logistic regression used to examine the effects of COVID-19 on food security measured by low household food availability, an increase in food prices, farmers' inability to harvest their crops, and low output due to the lockdown imposed by the government to contain the spread of COVID-19. The effects of some socioeconomic characteristics on farming household food security were also presented in Table 4.

Table 4. Effects of COVID-19 on the food security of rural farming households.

Variables	Coefficient	Std. Err.	Z	P>z	Marginal effects
Low food availability	-0.702352***	0.219017	-3.21	0.001	-0.1553
Increase in food price	-1.733186***	0.663286	-2.61	0.009	-0.4102
Inability to harvest crop	-0.929071*	0.541315	-1.72	0.086	-0.1998
Low output	-0.735977	0.508014	-1.45	0.147	-0.1627
Educational level	0.157944*	0.086652	1.82	0.068	0.0349
Major occupation	0.476884	0.759786	0.63	0.530	0.1054
Farming experience	-0.012473	0.022348	-0.56	0.577	-0.0028
Household size	-0.246732	0.363295	-0.68	0.497	-0.0545
Cooperative memberships	1.859568***	0.604476	3.08	0.002	0.4328
Income	0.094915**	0.039221	2.42	0.015	0.0214
Access to extension	-0.780762	0.554817	-1.41	0.159	-0.1726
Access to credit	1.382905***	0.506836	2.73	0.006	0.3057
Constant	-2.231246	1.715658	-1.30	0.193	
Pseudo R^2	0.2518				
LR chi^2	39.98				
Prob > chi^2	0.0000				
Log-likelihood	-59.39673				

Source: Field survey, 2020. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

The coefficient of low household food availability had negative and significant (p<0.01) effects on the food security of rural farming households. A percentage decrease in food availability increases the likelihood of being food insecure by 15.53%. This implies that the households experiencing low food availability due to the pandemic were affected by food insecurity. This is because household food security depends on the availability of food. The pandemic led to a decrease in food availability in rural farming households, as farmers were unable to engage in their normal farming activities during the lockdown, especially in the first phase of the pandemic. This result corroborates the study by UNDP (2020b) that COVID-19 containment measures increased the number of people who experienced a deterioration in food security.

The coefficient of the increase in food prices was negative and significant ($p< 0.01$) in relation to the food security of farming households. A percentage increase in food prices decreases the likelihood of being food secure by 41.02%. Thus, high food prices due to the pandemic increased the likelihood of being food insecure among rural farming households. This supports the view of Devereux et al. (2020) and Egwue et al. (2020) that COVID-19 has increased food prices, which could consequently affect household food consumption. As food prices increased and household income decreased due to the pandemic, household purchasing power for food would decrease. This would reduce household food consumption and food security.

The movement restriction imposed by COVID-19, which prevents the farmers from harvesting their crops, had a negative and significant effect on the food security status of the farming households ($p< 0.1$). The result suggests that a percentage increase in farmers' inability to harvest their crops decreased the probability of being food secure by 19.98%. This implies that the imposed lockdown and movement restrictions, which inhibit farmers from accessing their farms to harvest their products, increased the likelihood of being food insecure. This is because rural smallholder households depend on their farm output to survive. Thus, any disruption to their farming activities would have a severe impact on their income, food security, and well-being. Therefore, the COVID-19 pandemic, as a result of the lockdown measures, has negatively affected the availability of food and food security of rural farming households. This is in line with the FAO (2021) statement that the pandemic has affected the agri-food systems, people's livelihoods, food security, and nutrition.

The level of education had a positive and significant effect on the food security status of the farming households ($p<0.1$). A percentage increase in the educational status of the household heads increased the probability of being food secure by 3.49%. This implies that households whose heads are educated are more likely to be food secure than households whose heads are not educated. This could be because education enhances the decision-making process and provides access to relevant information, which could likely increase the chance of being food secure. This corroborates the findings of Egwue et al. (2020) and Oyebanjo et al. (2013) that the level of education enhanced household food security.

The coefficient of cooperative memberships had a positive and significant effect on the food security status of farming households ($p<0.01$). A percentage increase in cooperative membership will increase the likelihood of being food secure by 43.28%. This implies that cooperative membership is an enhancer of rural food security. Thus, a farming household whose head is a member of a cooperative association is likely to be food secure, while those that do not belong to the cooperative society are likely to be food insecure. This could be a result of the benefits such as economies of scale, access to agricultural information, and

credit derived from the society by its members. Mukaila et al. (2020) and Oyebanjo et al. (2013) also reported that members of cooperatives had a high probability of being food secure.

The income of smallholder farmers had a positive effect on the food security status of the farming household ($p< 0.05$). A percentage increase in the income of smallholder farmers increased the probability of their households being food secure by 2.14%. This implies that the income of household heads is a significant enhancing factor in household food security. A household whose head has a high income is likely to be food secure, while a household with a low income has a high chance of being food insecure. In the era of the pandemic, when food prices rise, higher-income households have enough money to buy food, while low-income households have little money to buy food items. The decline in income and the increase in food prices due to the pandemic make food insecurity a major concern among low-income earners (Aromolaran et al., 2020; FAO, 2020b). This supports Falola et al. (2023), Salau et al. (2019), and Omotesho et al. (2006), who found that income enhanced the food security of farming households.

Access to credit positively influenced the food security of farming households ($p< 0.01$). A percentage increase in access to credit increased the likelihood of being food secure by 30.57%. This implies that households whose heads can access credit are likely to be food secure, while those whose heads are unable to access credit are likely to be food insecure. This is because of the financial hardship and inability to get food items that are not produced by the farming households as a result of the COVID-19 lockdown which has lowered food availability in their households during the period, so borrowing money became one of the ways out. Therefore, farmers who could access credit used the money for household consumption to curb the effect of COVID-19 on their food security status. A similar result was reported by Frimpong and Asuming-Brempong (2013) and Ibrahim et al. (2016), indicating that access to credit positively affects food security.

Farming household food insecurity coping strategies during COVID-19

The food insecurity coping strategies adopted by farming households during the COVID-19 pandemic are shown in Table 5. The farming households were able to cope with the food insecurity situation during the pandemic by adopting a less expensive diet ($\bar{x}$ = 2.69). This strategy was ranked first among the coping strategies. It enabled them to procure more food to feed their households with the available money. However, this method could restrict them to consuming a particular food, which might not give them the required nutrients for a healthy life. The FAO (2020c) also reported that the COVID-19 crisis has led to the adoption of coping strategies such as eating cheap and less preferred foods by people. To cope

with food insecurity during COVID-19, farming households reduced their rational consumption ($\bar{x}$ = 2.65). This was the second most important coping strategy adopted and used to enable them to manage the food available in their households. This is in line with the FAO (2020c) report that households reduced the quantity of food to cope with the crisis. Borrowing money to buy food when there is no food in the household was widely adopted by rural farming households ($\bar{x}$ = 2.58). Household heads took out loans for consumption purposes during the pandemic. Some household heads even diverted credit meant for production activities to feed their households, which could affect the next planting season.

Table 5. Farming household food insecurity coping strategies during COVID-19.

Coping strategies	Always Freq (%)	Occasionally Freq (%)	Never Freq (%)	Likert Mean	Rank
Eating less expensive food	86 (71.7)	31 (25.8)	3 (2.5)	2.69	1
Reducing rational consumption	89 (74.2)	20 (16.7)	11 (9.2)	2.65	2
Borrowing money to buy food	75 (62.5)	40 (33.3)	5 (4.2)	2.58	3
Engaging in additional small-scale productivity activities	55 (45.8)	45 (37.5)	20 (16.5)	2.29	4
Buying food on credit	60 (50)	32 (26.7)	28 (23.3)	2.27	6
Skipping meals within a day	53 (44.2)	33 (27.5)	34 (28.3)	2.16	5
Backyard livestock production	42 (35)	48 (40)	30 (25)	2.10	7
Allowing children to eat first	40 (33.3)	41 (34.2)	39 (32.5)	2.01	8
Mortgaging and selling domestic assets	26 (21.7)	30 (25)	64 (53.3)	1.68	9
Eating wild fruits	11 (9.2)	42 (35)	67 (55.8)	1.53	10

Source: Field survey, 2020.

Engaging in additional small-scale productivity activities ($\bar{x}$ = 2.29) by the households was also adopted as a coping strategy to curb the effect of COVID-19 on the food security of the farming households. Some of the households processed palm fruits into palm oil in their land to earn money. The money they earned was used for household consumption. In the middle of the lockdown, when the farmers were unable to visit their farms and their savings were exhausted, they switched to buying food on credit ($\bar{x}$ = 2.27). They purchased food items in their neighbourhood that were sold at a higher price. Some rural households were able to cope with the crisis using these strategies. Skipping meals within a day was also adopted by farming households to cope with the situation ($\bar{x}$ = 2.16). This was common among the adults in the households when they had little food in their households. FAO (2020c) also reported that households reduced the frequency of meals to cope with the COVID-19 crisis. Smallholder farmers who kept some livestock such as goats and poultry in their backyards sold them to cope with the

food insecurity situation during the pandemic ($\bar{x}$ = 2.10). This helped them get some money to purchase food items for their household consumption. Some of the household heads and adults in the households always allowed the children to eat first to ensure that the children did not starve ($\bar{x}$ = 2.01). This was done to lower the chances of severe malnutrition among the children in the household. Mortgaging and selling domestic assets ($\bar{x}$ = 1.68) and eating wild fruits ($\bar{x}$ = 1.53) were considered less adopted coping strategies as their mean scores were below the Likert mean score of 2. Using all these coping strategies during the pandemic suggests that the COVID-19 crisis has severely affected rural food security. Meanwhile, some of the coping strategies are detrimental to their nutrition and health, which could result in food and nutrition deficiency diseases in rural households.

Conclusion

This study examined the food security status of rural farming households, the effects of COVID-19 on the food security of rural farming households, and how they coped with the menace of food insecurity during the pandemic. The study revealed that the majority of the farming households were affected by food insecurity and fell short of their calorie intake by 31.3% during the COVID-19 crisis. The pandemic, as a result of lockdown and movement restrictions, led to low availability of food in the households, an increase in food prices, low crop output, and the inability to harvest the crop, which consequently increased the likelihood of being food insecure in the farming households. Educational qualifications, cooperative memberships, income, and access to credit enhanced the probability of being food secure in rural households. The coping strategies adopted by the farming households during the food insecurity situation were reducing rational consumption, eating less expensive and less preferred food, borrowing money to buy food, allowing children to eat first, engaging in additional small-scale productivity activities, and buying food on credit. It can, therefore, be inferred from this study that the COVID-19 crisis has disrupted the food security of rural farming households.

To mitigate the adverse effects of COVID-19 on household food security, the study recommends that governments and non-governmental organisations provide support to farming households. This could take the form of palliatives for rural households that can be distributed by cooperative societies for effective distribution. Financial assistance in the form of grants or loans at a low and affordable interest rate spread over reasonable periods to ease repayment is also important to mitigate the effect of the pandemic on food availability and consumption. This would also help the farmers to have enough capital to boost their food production and, consequently, improve their food security status. Since

the agricultural activities of farmers have been disrupted, it is necessary for governments and agencies to provide free or subsidised agricultural inputs to farmers. This would enhance their planting activities for the next season, which in turn would result in food availability in the country and increase farmers' earnings.

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UTICAJI KOVIDA-19 NA PREHRAMBENU SIGURNOST RURALNIH POLJOPRIVREDNIH DOMAĆINSTVA. ISKUSTVA IZ NIGERIJE

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R e z i m e

U poslednjih nekoliko decenija, prehrambena nesigurnost je postala glavni globalni fenomen, zbog čega je iskorenjivanje gladi uvršteno na drugo mesto Ciljeva održivog razvoja. Ipak, pojava COVID-19 predstavila je ozbiljnu pretnju prehrambenom sistemu. Stoga postoji potreba da se proceni njegov uticaj na prehrambenu sigurnost. S tim u vezi, ova studija je ispitala uticaje COVID-19 na prehrambenu sigurnost ruralnih poljoprivrednih domaćinstava u državi Enugu u Nigeriji. Podaci prikupljeni od 120 domaćinstava analizirani su korišćenjem deskriptivne statistike, indeksa prehrambene sigurnosti i logističke regresije. Rezultati su pokazali da je u većini domaćinstava (64,5%) prehrambena sigurnost ugrožena (indeks 0,313), dok se samo 35,5% može smatrati prehrambeno sigurnim (indeks 0,109). Prosečna dnevna potrošnja kalorija odraslih osoba u domaćinstvima koja su bila prehrambeno nesigurna odnosno prehrambeno sigurna iznosi 1552,52 odnosno 2506,88 kalorija, redom. Niska dostupnost hrane (p<0,01), povećanje cena hrane (p<0,01) i nemogućnost žetve (p<0,1) povećali su verovatnoću prehrambene nesigurnosti. Tako je pandemija COVID-19, zbog nametnutog karantina, uticala na prehrambenu sigurnost domaćinstava. Nasuprot tome, pristup kreditu (p<0,01), obrazovanje (p<0,1), članstvo u zadrugama (p<0,01) i prihod (p<0,05) pozitivno su uticali na status prehrambene sigurnosti. Smanjenje veličine obroka, konzumiranje jeftinije hrane, preskakanje obroka, pozajmljivanje novca za kupovinu hrane, omogućavanje deci da jedu prva i uključivanje u dodatne nisko produktivne aktivnosti bile su glavne strategije suočavanja sa prehrambenom nesigurnošću koje su domaćinstva primenjivala tokom pandemije COVID-19. Rezultati istraživanja ukazuju da je potrebno da vlada i nevladine ogranizacije obezbede poljoprivredne inpute i finansijsku podršku poljoprivrednicima kako bi se suzbili štetni uticaji COVID-19 na prehrambenu sigurnost.

Ključne reči: COVID-19, prehrambena nesigurnost, ruralna domaćinstva, mali poljoprivrednici, strategije suočavanja.

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