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Original Article

Food Security among Smallholder Farming Households in Osun State, Nigeria: Factors and Coping Strategies

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A B S T R A C T

Climate change has negative impact on the global environment resulting in devastating effects such as pest and diseases, infertility of soil, and change in rainfall pattern, which affects food security. The study therefore examined food security among smallholder farming households, factors and coping strategies in Ife North Local Government Area, Osun State. A Three-stage sampling procedure was used to randomly select one hundred and forty-four (144) respondents. One hundred and thirty were retrieved (130) and were analyzed. Descriptive statistical and inferential statistics which include; frequency, percentages and ordinal logistic regression were used to analyze the data. Results showed the mean age was 46 years and income was ₦405,000 per year. Majority (78.5%) of the farmers were male, 86.9% sourced their information through community members, borrowing of funds (mean=3.1±0.79), consumption of less preferred food (mean=3.0±0.75) and working for other farmers for purchasing power (mean=3.0±0.83) were the leading coping strategies. Major factors perceived to influence coping strategies were Rain (mean=4.7±0.44), pest and diseases (mean=4.3±0.48) and fund (mean=4.1±0.95). Pest and disease (χ^2=22.532; p=0.000), soil fertility (χ^2=39.828, p=0.00) and household size (χ^2=5.000; p=0.025) were significantly related to coping strategies for food security of farming household. This study concluded that rainfall pattern, pest and diseases and funds were the major determinants of coping strategies for food security among the smallholder farming households. It is therefore recommended that access to farm inputs, finance and insurance for smallholder farmers must be improved and the government should provide agricultural loans to the rural farmers.to encourage their involvement.

Introduction

Climate change is now a reality and its impact on agricultural and others socio-economic activities cannot be under estimated (Shuaibu *et al*., 2014). The dependence of over 80% of crop production in Nigeria on rainfall has serious consequences on crop productivity with the advent of climate change (Agbo, 2012). Climate change leads to a distortion of seasonal pattern and consequently, changes in rainfall pattern. Climate patterns are already changing and undermining food security, production and nutrition. Food security is a fundamental human right enshrined in section 33, Article 1 of the 1999 constitution of Nigeria that every person has a right to life which must not be deprived. Food which is a substance capable of supplying all basic nutrients needed for the sustenance of man to grow, survive and be in good health becomes a paramount obligation for everyone to depend on as no cell could function in the absence of food. According to FAO, (2017) report, food insecurity has led to childhood overweight affecting over 38 million children below five years of age, with Africa and Asia representing 25 percent and 46 percent of the world total, respectively. Also an FAO (2013) report stated that about 842 million people of the population of the world were estimated to be suffering from chronic hunger, malnutrition and food insecurity which reduce their activeness in their day to day activities. The report also reveals that there is a

reduction in the number of undernourished and food insecure people from a sum of 868 million people between the periods 2010 and 2012 respectively. In 2017, the number of malnourished individuals is estimated to have reached 821 million – around one person out of each nine within the world. Hunger and severe food insecurity appear to be increasing in almost all sub-regions of Africa, as well as in South America, whereas the hunger state is stable in most regions of Asia (FAO, 2018).

The Sustainable Development Goals (SDGs) mentioned eradication of hunger from the earth to achieve food security and improved nutrition as their number two challenge which leads to defining food security as a means of getting sufficient food production which its accessibility is guaranteed across all genders and ages for an active and healthy life of individuals. Prakash-Mani (2013) estimated that about 25% of global food, feeding nothing less than 2 billion people in Asia, Latin America, and Africa is done by smallholder farmers. According to IFAD (2009), smallholder farmers produce nothing less than 80% of the total food in the country whereas; improvement in their productions does not increase their income and eliminate hunger from their community (Prakash-Mani, 2013). The status of food security here in Nigeria was borne out of lackadaisical attitude and brain drain which has birthed poverty and malnutrition among the low-income farmers. Nwajuiba, (2013), affirmed that the drop-in household eagerness to agriculture was not due to the outcome of structural economic but majored on brain drain, that is, household detesting rural life to urban settlement.

In the production of food, the smallholder farmer is a central player in ensuring that food security is guaranteed through increased diversification of agricultural activities, for example, crop production, livestock production, fishing (artisanal fishing and aquaculture fishing). Adedipe et al., (2013) acknowledged that smallholder farmers are the major backbone of agriculture in the production of food and feeding nothing less than 90% of Nigerians, making use of the indigenous farm tools for farm practices. The high yielding result in the agricultural sector in a developed country is due to the implementation of intensive agriculture with the help of mechanization. But Nigeria is falling apart due to stagnancy in technology (Nwajuiba, 2013). FAO (2017) reported that about 7.1million people in Nigeria need lifesaving and livelihood protection because they are being challenged by acute food insecurity. The majority of Nigerians are dependent on the importation of food which has enormously led to a hike in the price of food, low quality of food and chronic malnutrition among different age groups with rural dwellers suffering the most. Food insecurity in South-West despite the favourable weather and fertile lands could have occurred because of various factors which can be known through research. Generally, food insecurity in Ife North local government is linked with poverty. Poverty has always been the bedrock in every food-insecure area, most especially, among rural settlement.

Nigeria has been a major producer of food crops such as tuber crops, legumes, and cash crop even before the oil boom (Ogunsimi, 2007). There can never be a development in the Nigeria economy if the sustainable agriculture that has given birth to human needs is denied (Edeoghon *et al*., 2008). Meanwhile, an estimation of about 53 percent is food insecure in south-west Nigeria which figure varies geographically (Akinleye, 2009). In order to combat and bridge the gap in this study, which is the problems of climate change on food security, there a compelling need to adopt coping strategies that will help secure food and make it available. This study therefore, seeks to examine food security among smallholder farming households in Nigeria: factors and coping strategies. The specific objectives were to describe the socio-economic characteristics of the smallholder farming households in the study area; identify the source of extension information on food security in the study area; determine the coping strategies for food security used by smallholder farming households in the study area; and identify the factors that influenced coping strategies for food security among the smallholder farming households in the study area.

The null hypothesis (Ho) tested that was there is no significant relationship between coping strategy for food security used by farming households and the factors that influenced smallholder farming households coping strategies in the study area.

Materials and method

The targeted population for the study comprised of smallholder farming households in Ife North Local Government, Osun State, Nigeria. The three-stage sampling procedure was used for the study. The first stage involved a random selection of three (3) districts out of seven (7) districts that are in the study area by dip hat method. The three districts are Ipetumodu, Moro, and Edunabon. The second stage involved the random selection of six (6) villages from each of the three districts to make eighteen (18) villages. The third stage involved the random selection of eight (8) smallholder farming households in each of the eighteen (18) selected villages. This gave a total sample size of one hundred and forty-four (144) smallholder farming households.

Out of one hundred and forty-four (144) selected respondents that the interview schedule was administered to, One hundred and thirty were retrieved (130) were analysed. The survey therefore had a response rate of 92.3%. Data collected for this study were analysed using both descriptive and inferential statistics. Simple descriptive such as frequency counts, mean, percentage count, and standard deviation was used to analyse the data. Ordinal logistic regression was used to analyse the hypothesis.

Results and Discussion

Table 1. Socio-economic Characteristics of respondents (n=130).

Variables	Frequency	Percentage (%)
Age (years)		
20 – 40 (young)	54	41.5
41 – 60 (middle	51	39.2
>60 (old)	25	19.2
Mean ± SD	46.8 ± 13.8	
Sex		
Male	102	78.5
Female	28	21.5
Marital Status		
Single	9	6.9
Married	92	70.8
Widowed	14	10.8
Divorced	3	2.3
Separated	12	9.2
Educational level		
No formal education	45	34.6
Adult education	7	5.6
Primary education	34	26.2

Variables	Frequency	Percentage (%)
Secondary education	42	32.3
Tertiary education	2	1.5
Household Size (persons)		
5 and below	23	17.7
6 – 10	78	60.0
11 – 15	25	19.2
16 and above	4	3.1
Mean ± SD	8.3 ± 3.4	
Farming experience (years)		
Less than 10	13	10.0
10 – 20	38	29.2
21 – 30	35	26.9
31 – 40	25	19.2
Above 40	19	14.6
Mean ± SD	26.3 ± 13.3	
Types of the crop planted	(*)	
Cereals	60	46.2
Cereals and Legumes	73	56.2
Cereals, Legumes, Root, and tubers	128	98.5
Vegetables	55	42.3
Cash crop	81	62.3
Farm size (Hectares)		
1 – 5	71	54.6
6 – 10	50	38.5
11 – 15	7	5.4
16 and above	2	1.5
Mean ± SD	5.5 ± 3.4	
Household Income from farm enterprise (Naira)		
≤ 250,000	45	34.6
251,000 – 500,000	56	43.1
501,000 – 750,000	20	15.4
≥ 751,000	9	6.9
Mean	405,000.0	
Primary occupation		
Farming	109	83.8
Access to credit		
Yes	67	51.5
No	63	48.5

Source: Field survey, 2019
(*) Multiple responses

The result from table 1 shows that the mean age of the smallholder farming households in Ife North Local Government Area is 46.8. This implies that more than half of the respondents (79.2%) were still in their middle, active and productive age. This finding is supported by the work of Olaleye, Ibrahim, and Ojo (2009) who had earlier reported that most of the farmers that were sampled in Bosso LGA, Niger state were within the productive age. The result further indicates that majority (70.8%) of the respondents were married of the respondents were married and it is similar to the findings of (Daudu *et al*., 2015) who reported that married respondents tend to be more involved in agriculture.

Also, from Table, 34.6% of the respondents had no formal education, 32.3% had secondary education, 26.2% had primary education, 5.6% had adult education and 1.5% of the respondents had tertiary education showing that the majority of the respondents had no formal education. This study is in line with the findings of (Daniel *et al*., 2012) who found out that in developing countries, the industrial sector is usually dominated by smallholder farmers with low levels of education.

The household size result from Table 1 shows that 17.7% were below 5 in size, 60.0% had 6-10 household size, 19.2% had 11-15 household size, while 3.1% had 16 household sizes and above. This implies that the majority (60.0%) of the smallholder farming households in the study area were within 6-10 household size. According to Onubuogu *et al*., 2014, married farmers have easy access to large family sizes and land which compliment family labour and reduce the cost of hired labour.

Table 2. Households' Sources of Information on Agriculture.

Sources	Frequency	Percentage
Extension agent	52	40.0
Conference/seminar/workshop	38	29.2
Radio	107	82.3
Television	58	44.6
Agric. Show	16	12.3
Print media	39	30.0
Family member	79	60.8
Journal	57	43.8
Community members	113	86.9
GSM	93	71.5

Source: Field Survey, 2019

The result in table 2 shows that the majority (86.9%) of the smallholder farming household sourced their information through community members, and family members (60.8%). Community members and family members' means of sourcing information implies close relation and mouth to mouth method of information dissemination is common among farmers in the study area. Radio (82.3%) was also found as sources of information among the majority of the respondents. This also agrees to the findings of Fadairo and Oyelami (2019) as radio being the most effective media in disseminating information. AFRRI (2008) further opined that radio is one of the broadcast media which almost all experts identify as the only medium of mass communication the rural population is very familiar with and the most appropriate for the rural emancipation program. This is because a radio broadcast can beat distances, and thus has immediate effect and that it is cheap to obtain and widely owned among farmers.

Table 3. Households' Coping Strategies on Food Security.

Strategies	Always F(%)	Often F(%)	Rarely F(%)	Never F(%)	Mean ± SD	Mean ranking
Borrowing of funds	46(35.4)	64(49.2)	14(10.8)	6(4.6)	3.1 ±0.79	1st
Consumption of less preferred food	39(30.0)	65(50.0)	23(17.7)	3(2.3)	3.0 ±0.75	2nd
Working for other farmers for purchasing power	42(32.3)	50(38.5)	35(26.9)	3(2.3)	3.0 ±0.83	3rd
Provision of orthodox preservative agents for farm produce	28(21.5)	66(50.8)	32(24.6)	4(3.1)	2.9 ±0.76	4th
Limiting portion sizes at mealtime	24(18.5)	62(47.7)	35(26.9)	9(6.9)	2.8 ±0.82	5th
Reduction of the number of meals per day	19(14.6)	62(47.7)	43(33.1)	6(4.6)	2.7 ±0.76	6th
Borrowed food from neighbours	24(18.5)	52(40.0)	44(33.8)	10(7.7)	2.6 ± 0.86	7th
Adoption of new technologies for adequate food production	7(5.4)	55(42.3)	63(48.5)	5(3.8)	2.5 ±0.66	8th

Strategies	Always F(%)	Often F(%)	Rarely F(%)	Never F(%)	Mean ± SD	Mean ranking
Sending some household members to live with other relatives	4(3.1)	52(40.0)	69(53.1)	5(3.8)	2.4 ±0.62	9th
Migration of members of the household to cities in search of jobs	12(9.2)	43(33.1)	56(43.1)	19(14.6)	2.3 ±0.84	10th
Sale or mortgage of household assets	4(3.1)	31(23.8)	66(50.8)	29(22.3)	2.1 ± 0.76	11th
Dropping out of the school of household members	7(5.4)	25(19.2)	63(48.5)	35(26.9)	2.0 ±0.82	12th

Source: Field Survey, 2019
F(%) = Frequency(percentage), SD = Standard deviation

Having identified the factors of climate change in rainfall pattern, respondents further indicated the strategies employed in coping with the effects in Table 3. The leading strategies were borrowing of funds, consumption of less preferred food and working for other farmers for purchasing power which insinuate that farmer works with other farmers so as to get money for food to be accessible. This implies that as these coping strategies are identified and maintained by the small holder farmers, the more they are food secured. Also by adopting coping strategies decrease the vulnerability of the rural hold, exacerbating the scope for breaking the cycle of poverty (Farzana *et al*., 2017).

Table 4. Factors that Influence Coping Strategies for Food Security.

Factors	SA F(%)	A F(%)	U F(%)	D F(%)	SDA F(%)	Mean ± SD	Mean ranking
Rainfall pattern	96(73.8)	34(26.2)	0	0	0	4.7 ± 0.44	1st
Pest and diseases	42(32.3)	87(66.9)	1(0.8)	0	0	4.3 ± 0.48	2nd
Fund	46(35.4)	66(50.8)	8(6.2)	5(3.8)	5(3.8)	4.1 ± 0.95	3rd
Food price	13(10.0)	103(79.2)	14(10.8)	0	0	3.9 ± 0.45	4th
Soil fertility	36(27.7)	60(46.2)	8(6.2)	3(2.3)	23(17.7)	3.6 ± 1.38	5th
Storage facilities	25(19.2)	62(47.7)	20(15.4)	3(2.3)	20(15.4)	3.5 ± 1.27	6th
Age of the house head	13(10.0)	61(46.9)	41(31.5)	10(7.7)	5(3.8)	3.5 ± 0.91	6th
Reduced number of Household size	14(10.8)	63(48.5)	34(26.2)	4(3.1)	15(11.5)	3.4 ± 1.10	7th
Agricultural technologies	7(5.4)	65(50.0)	47(36.2)	1(0.8)	10(7.7)	3.4 ± 0.91	7th

Source: Field Survey, 2019
F(%) = Frequency(percentage), SD = Standard deviation, SA=Strongly agree, A=Agree, U=Undecided, D=Disagree, SDA=Strongly Disagree

As illustrated in Table 6, rain (mean=4.7 ± 0.44), pest and diseases (mean=4.3 ± 0.48), and fund (mean=4.1 ± 0.95) were the first, second and third factors perceived by respondents to influence coping strategies adopted for food security by farmers in the study area. The result shows that rain affects the respondents in the area of growing crops which in turn led to a decrease in the output of produce making food not to be available at all times. Hence, this affects food security as food not being available to the households. According to the respondents, too much rain causes crops like the cocoa plant to sink while low rainfall makes the evapotranspiration to be low leading to low photosynthesis and an increase in flaccidity of the crops. This allign with the findings of Gao and Mills (2021), variations in rainfall pattern affects the household consumption. The second position being which pest and disease have led to various damages to the crops which are effect has made food security to be threatened in the study area. The third position which is fund has led to an enormous decrease in the interest of the respondents to agriculture, they were being denied of loan from the bank and the attitude of the government to requirement of fund to the smallholder farming household is at zero level which in turn influenced the coping strategy in the study area.

Table 5. Results of ordinal logistic regression analysis of the relationship between factors and household coping strategy on food security.

Factors	Estimate	Std. Error	Wald	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Rainfall pattern	-.675	.357	3.574	.052	-1.374	.025
Pest and diseases	.601	.127	22.532	.000	.353	.850
Soil fertility	.706	.112	39.828	.000	-.241	.423
Agric. Technology	.081	.173	.219	.640	-.259	.421
Reduced number of Household size	4.850	2.169	5.000	.025	.599	9.102

Link function: Logit.

The result in table 4 shows that there is significant relationship between factors influencing such as; pest and diseases, soil fertility, reduced number of household size and the coping strategies used to ensure food security . This implies that the more effect of pests and diseases the higher the coping strategies adopted to ensure food security. Also climatic condition determines the soil fertility in crop production to ensure food security.

Conclusion and Recommendations

Based on the results obtained from the analyses, the study concluded that the major determinants influencing coping strategies for food security were; rainfall pattern, pest and disease, and fund. The findings also identified; borrowing of funds, consumption of less preferred food and working for other farmers for purchasing power as the major coping strategies employed by the households towards ensuring food security in the study area. Therefore, the study concluded that the smallholder farming household are to some extent food secured in the study area. Hence, the following recommendations were made;

- Access to farm inputs, finance and insurance for smallholder farmers must be improved because this could make farming for smallholders much easier, increase their production of food and also their access to markets and which will, therefore raise their farm incomes.
- Smallholder farmers should also be encouraged to diversify their production and focus more on producing other food types that provide nutrients so that the nutrition aspect on the food security definition can be achieved too. Accessibility to food without adequacy in terms of nutritional component of diets will make food security incomplete.
- Education about nutrition, health and child care can also be done so provide smallholders farmers with more knowledge on how best to go about their production.
- Increasing access and protecting the smallholder farmers' rights to land will motivate them to increase their scale of operation and encourage increased production.
- Agro-chemical institutes should provide effective and affordable access to pesticides and training on the control of pests and diseases available to the farmers.
- The government should provide agricultural loans to the rural farmers to encourage and bring about the urge to be involved in agriculture and they should also involve them in improving the physical infrastructure and institutional infrastructure in the study area.
- Research institutions should come up with measures in which local farmers will be able to cope with factors influencing food security coping strategies.

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