FOOD SECURITY STATUS OF ARTISANAL FISHING HOUSEHOLDS IN OGUN WATERSIDE LOCAL GOVERNMENT AREA OF OGUN STATE

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ABSTRACT

Majority of the fishing households in Nigeria has been associated with low food security and malnutrition, therefore, this study examine the nutritional status of fishing households in Ogun waterside local government area of Ogun state. Three communities within the selected local government were purposively selected and random selection of households, they are: Agbalegiyo (26), Ilamo (22) and Iwopin (37). A total of 85 fishing households were accessed through the use of validated interview guide. Data were analyzed using descriptive statistics and regression analysis. 45.9% of the fishers had a mean age of 50.64±12.11, 85.9% were male and married (89.4%). 62.4% of the fishers were food secure. Also, 15.3% and 5.9% indicated high food security and marginal food security respectively. Years spent in school ($\beta = 0.032$, $P < 0.01$), number of dependent ($\beta = 0.970$, $P \leq 0.01$) and age of respondents were significant to food security index. The study concluded that years spent in school, number of household dependent and age has great influence on the food security status of the fishing households. Livelihood improvement through income diversification was recommended.

Keywords: Fishing Households, livelihood, Food Security, Nutritional status

INTRODUCTION

Nigeria Agriculture sector remains a viable sector contributing an average of 24% to the Nation's GDP between 2013 and 2019 (Oyaniran, 2020). The fisheries sub-sector contributes an average of 3.26% to the Agricultural GDP of the Nigerian economy between 2002 and 2020 (FAO, 2023). The Nation's total fisheries and aquaculture production was 1,044,812 tons with 75% from fisheries and 25% from Aquaculture. Fish available for consumption is about 9.1kg/capital (FAO, 2023), this indicated a shortfall in fish available for consumption when compared with FAO report of 2018. The recent Global Food Security Index, 2022, ranked Nigeria 103rd out of 121 countries with sufficient data to calculate 2022 Global Hunger Index (GHI). Nigeria had 27.3% score indicating a serious level of hunger with about 15% of the population undernourished.

Food security is defined by the Food and Agriculture Organization (FAO) of the United Nations as a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life (FAO, 2022).

It occurs when all people, all of the time, have access to sufficient, safe, affordable, and nutritious food for a healthy diet (Benton, 2017). This definition explains food security as a concept involving multiple dimensions such as food availability, access, utilization, and stability (Gross *et al*., 2000). Measuring food security is complex (Barrett, 2010), and has evolved from focusing on food supply aggregated at national, regional and global levels to including food demand and access at the scale of households and individuals (Andersen *et al*., 2009; Leroy *et al*., 2015). Household food insecurity has insidious effects on the health and development of young children, including increased hospitalizations, poor health, iron deficiency, developmental risk and behavior problems, primarily aggression, anxiety, depression, and attention deficit disorder (Cook and Frank, 2008). Food security encompasses food availability, accessibility, utilization, entitlement, and sufficiency (FAO, 2015). Food availability relates to the quantity, quality, and diversity of food. A decline in food availability is neither necessary nor

sufficient to create hunger, even though it remains a key indicator of food security. Therefore, reducing food insecurity among artisanal fishers will entail prioritizing fisheries sector in economic and policy development that will foster resilient livelihoods and achieve nutrition security through availability and sustainability of livelihood assets (social capital assets).

Social capital refers to the internal social and cultural coherence of society, the norms and values that govern interactions among people and the institutions in which they are embedded (Adepoju, 2019). Social capital assets directly and indirectly ensures food security through improved interactions and connections between fishers. The rationale behind social capital is that an individual's family, friends, and associates constitute an important asset, one that can be called upon in a crisis, enjoyed for its own sake, and/or leveraged for material gain (Putnam, 1995).With regards to food security, social capital has the power to mitigate shocks to income and food supplies especially in times of crises. Members of social groups who know and trust each other may be more likely to give each other food or financial support to buy food. This conceivably largely influences the consumption possibilities of individuals in terms of access to food, especially households with limited financial or lack food resources. Households with higher levels of social capital are less likely to experience hunger. With regards to fish production, social networks may indirectly affect productivity by influencing the adoption of improved fishing practices and technologies through free flow of information among its members (Katungi, 2007; Liverpool and Winter-Nelson, 2011). Social capital may also directly influence productivity through supply of labour from the social relationships available to the individual. This is important in the increasing phase of rural-urban migration, which has created restrictions in the supply of rural farm labour. Fish productivity is important in ensuring food security among farmers; higher fish production will translates into larger food supplies and consequently lower food prices for consumers and lower food expenditure for rural farm house-holds (Liverpool-Tasie, 2012). The broad objective of the study is to determine the food security status of artisanal fishing households in Iwopin Fishing Community Area of Ogun State. While the specific objectives are to; identify the socio economic characteristics of fishing households, identify the fishing characteristics of the fishing households, determine the food security level of fishing household in the study area and assess the socio economic determinants of food security in the study area.

MATERIALS AND METHODS

Study area

The research was conducted in Ogun Waterside Local Government Area of Ogun State, Nigeria, located between 4'15'E430'E and 6'20'N 6'45' N and is bordered on the east by the Lekki lagoon and on the south by the Benin Bight. A variety of canoes, both motorized and non-motorized, gillnets, seine nets, cast nets, and non-return valve traps are among the fishing gears used for fishing in the area. According to Abdul (2009), there are various fish species in the lagoon such as *Chrysichthys nigrodigitatus* (Obokun) and *Gymnachus niloticus* (eja osan).

The primary occupation in this locality is fishing. Artisanal fisher folks within the lagoon mainly exploit the fisheries using wooden/dug-out canoes ranging in size from 3m to 8m long. The canoes are paddled or powered by small outboard engines and manned by an average of two men. From these boats, the fishers operate their cast net, hook and lines, gill net, stow nets, traps, lift nets, basket traps

Sampling procedure

A multi-stage sampling techniques was employed to select eighty-five (85) artisanal fishers. The first stage involves the purposive selection of Ogun Waterside Local Government Area (LGAs) which are predominantly noted for fishing activities. Followed by purposive selection of major fishing communities within the LGA. These communities in Ogun Waterside include Agbalegiyo, Ilamo and Iwopin. The final stage involves the random selection of fishing households within the selected fishing communities.

Data collection

Data were collected with the aid of validated and pretested well-structured interview guide which was designed with three sections viz- Socioeconomic characteristics of artisanal fishers, Household consumption and Household Food security. The interview guide was administered by the researcher and fishers' responses were recorded immediately.

Analytical techniques

Data on the socio-economic characteristics, household consumption and household food security of fishing households were subjected to descriptive statistics (frequencies, percentages, means and standard deviation) and regression model. Food security status was measured by adapting 18-item household food security survey developed by United States Department of Agriculture (USDA, 2012). The fishers were asked to choose a frequency defined as "don't know" "never" "rarely", "sometimes" or "often" to describe their responses to the questions regarding food availability, food accessibility, food utilization and food affordability. Responses were scored in the following manner: "often true" and "sometimes true" were coded as affirmative (value=1), "never true" was coded as negative (value=0). Each of the items were scored with a "1" if the response indicated food insecurity and "0" if it did not. The minimum and maximum possible scores were 0 and 18 for the households. Based on the scores, the household food security status was categorised as 0: Food secure, 1-2: Food secure at risk; 3-7: Food insecure without hunger, and 8-18: Food insecure with hunger.

The fishing households were asked to indicate (tick) the appropriate option in response to each of the following statements in a way that best describes the situation of food consumed in their household in the last 30 days.

S/NO	STATEMENT	How True is Statement			
		Often True	Sometimes True	Never True	Don't Know
1	(I/We) worried whether (my/our) food would run out before we got money to buy more.				
2	The food that (I/we) bought just didn't last, and (I/we) didn't have money to get more				
3	(I/we) couldn't afford to eat balanced meals.				
		Yes	No	Don't Know	
4	Did you ever eat less than you felt you should because there wasn't enough money for food				
5	Were you very hungry but didn't eat because there wasn't enough money for food				
6	Did you lose weight because there wasn't enough money for food?				
		Often True	Sometimes True	Never True	Don't Know
7	(I/we) relied on only a few kinds of low-cost food to feed (my/our) child/the children) because (I was/we were) running out of money to buy food.				
8	(I/We) couldn't feed (my/our) child/the children) a balanced meal, because (I/we) couldn't afford that?				
9	(My/Our child was/The children were) not eating enough because (I/we) just couldn't afford enough food?				
		Yes	No	Don't Know	
10	Did you ever cut the size of (your child's/any of the				

children's) meals because there wasn't enough money for food?

11 (Was your child/were the children) ever hungry but you just couldn't afford more food

12 Did (your child/any of the children) ever not eat for a whole day because there wasn't enough money for food?

13. Did (CHILD'S NAME/any of the children) ever skip meals because there wasn't enough money for food?
Yes ( ) No ( ) Don't Know ( )

14. If YES from above, how often did this happen?
Almost every week ( )
Some weeks but not every week ( )
Only 1 or 2 weeks ( )
Don't Know ( )

15. Did (you or other adults in your household) ever not eat for a whole day because there wasn't enough money for food?
Yes ( ) No ( ) Don't Know ( )

16. If YES from above, how often did this happen?
Almost every week ( )
Some weeks but not every week ( )
Only 1 or 2 weeks ( )
Don't Know ( )

17. Does your gender affect the level of your food consumption? Yes ( ) No ( )
If Yes from above, how?

18. Did (you or any adults in the household) food consumption based on household activities or income generated to the family. Yes ( ) No ( )
If Yes from above, why and how?

RESULTS

Socio-economic Characteristics

The socio-economic characteristics of the fishermen are presented in Table 1. It shows that 67.2% and 18.9% were within the age brackets of 21-40 years. The mean age was (50.64±12.105). Majority (85.9%) of the respondent were males while (12.9%) were female. More than half (81.2%) were Muslims while 11.8% and 7.1% were traditional worshipers and Christians respectively. Majority (89.4%) of the fishermen were married, and 4.7% were single. Table 1 also reveals that 61.2% of the fishermen had a household size of 0-5 persons while 28.2% and 8.2% had household size ranging from 6-10 and 11-15 respectively, and 2.4% for household size greater than 16 persons. Most (81.2%) of the fishermen had number of household dependent ranging from 0-5 while 13.1% and 4.8% had number of household dependent ranging from 6-10 and 11-15 respectively. Majority (88.2%) were involved in fisheries primarily, while (11.8%) were involved in non-fisheries occupation.

Table 1 also shows that majority (64.9%) of the fishermen estimated monthly income ranges from 75,001 – 235,000; (30.7%) of the fishers income ranges from 15,000 - 75,000 while 2.4% and 2.4% of the fishermen income ranges from 235,001 - 295,000 and above 295,000 respectively. The mean income was 119,352±65,618.79. Majority (93.0%) of the fishermen had number of income earning members ranging from 1-4 persons, while few (7.1%) of the fishermen had number of income earning members ranging from 5-8 persons.

Table 1**: Socio-economic Characteristic of respondent (n = 85)**

Variables	Frequency	Percentage	Mean ± Std Dev
Age of respondent			
≤ 20	2	2.4	
21 – 40	16	18.9	
41 – 60	57	67.2	
61- 70	9	10.7	50.64±12.105
>70	1	1.2	
Level of education			
Gender of respondent			
Male	73	85.9	
Female	11	14.1	
Religion			
Christianity	6	7.1	
Islam	69	81.2	
Traditional	10	11.8	
Marital status			
Married	76	89.4	
Single	4	4.7	
Divorced / Separated	1	1.2	
Widowed	4	4.7	
Household size			
0 – 5	52	61.2	
6 – 10	24	28.2	5.95±3.687
11 – 15	7	8.2	
>16	2	2.4	
Number of dependent			
0 – 5	69	81.2	
6 – 10	11	13.1	4.14±3.546
11 – 15	4	4.8	
>16	1	1.2	
Is fishing the main primary occupation?			
Yes	75	88.2	
No	10	11.8	
Estimated monthly income			
15,000 – 75,000	26	30.7	119352.94±65618.79
75,001 – 235,000	54	64.9	
235,001 – 295,000	2	2.4	
>295,000	2	2.4	
Number of income earning member			
1 – 4	79	93.0	2.21±1.372
5 – 8	6	7.1	
How long have you been living in the study area			
5 – 15			
16 – 30			
31 – 45			
46 – 60			
>60			

Source: Field survey (2022)

Figure 1 shows that close to an average 44.70% of the fishermen had primary education, 37.60% had no formal education, while few 15.30% and 2.40% had secondary and tertiary education respectively.

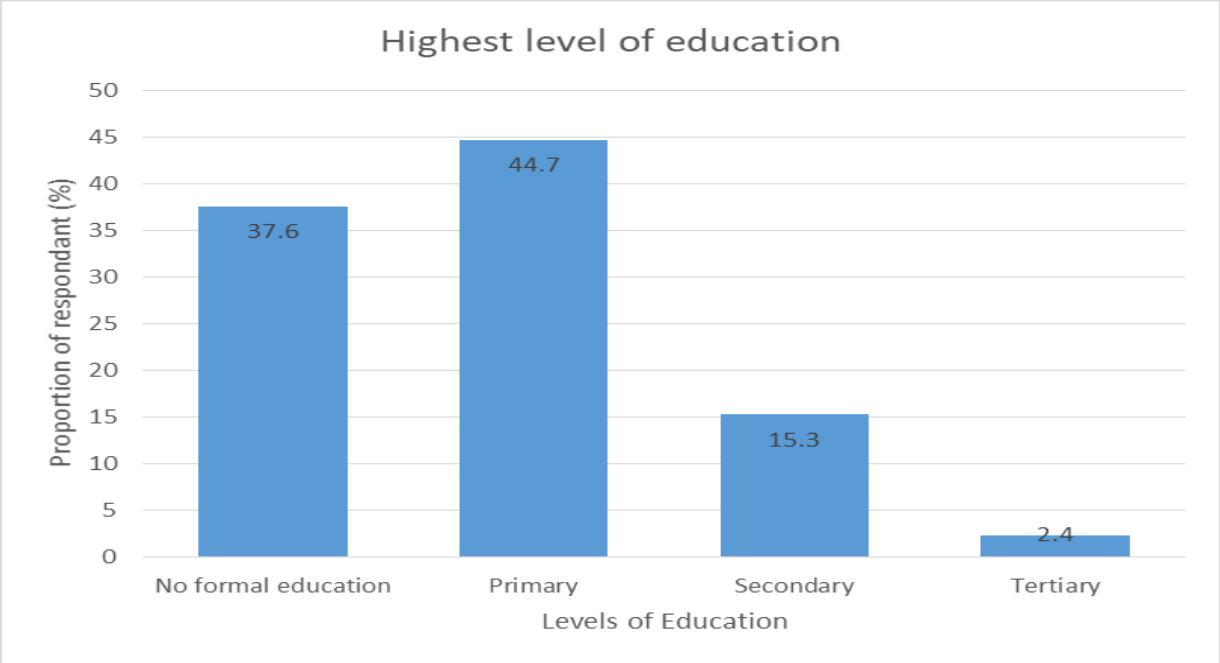

Figure 1: Distribution of respondent by educational level
Source: Field survey, 2022

Fishing Characteristics of Artisanal Fisher's

The Fishing characteristics of artisanal fishers are presented in Table 2. It reveals that majority (63.6%) of the fishermen engages in fishing for working hours ranging from 2 – 5 hours per day, while 29.4% of the fishermen engages in fishing for working hours ranging from 6 – 9 hours per day.

The results in Table 2 also reveals that close to an average (41.2%) of the fishermen had 21 - 40 years of experience in fisheries, and 29.4% between 1 - 20 years and >40 years of expertise, respectively. Also, the result reveals that 63.5% of the fishermen participate in fishing in the morning, 15.3% participate in fishing in the afternoon 21.2% and night. Table 2 also reveals that most (28.4%) of the fishermen resided in the community for 31 – 45years and 46 – 60years, 19.0% and 16.6% of the fishermen resided for 16 – 30years and 5 – 15years respectively, while (8.4%) of the fishermen resided for more than 60 years, respectively.

Table 2: Fishing characteristics of artisanal fishers (n = 85)

Variables	Frequency	Percentage	Mean± Std Dev(SD)
Time spent in fishing (hours/day)			
2 – 5	54	63.6	
6 – 9	25	29.4	5.54±1.756
10 – 12	6	7.1	
Years of fishing experience			
1 – 20	25	29.4	
21 – 40	35	41.2	31.52±15.41
>40	25	29.4	
Period of fishing			
Morning	54	63.5	
Afternoon	13	15.3	
Evening	18	21.2	
How long have you been living in the area			
5 – 15	14	16.6	
16 – 30	16	19	
31 – 45	24	28.4	38.61±17.949

46 – 60	24	28.4
>60	7	8.4

Source: Field survey (2022)

Food Security

Table 3 reveals that more than half (62.4%) of the fishing households were food insecure with hunger, while 16.5% were food insecure without hunger. From the sampled respondent, result reveals that (15.3%) and (5.9%) were food secure and food secure but at risk respectively.

Table 3: Food Security among respondents (n = 85)

	Frequency	Percentage
Food secure	13	15.3
Food Secure, at risk	5	5.9
Food insecure without hunger	14	16.5
Food insecure with hunger	53	62.4

Results on socio-economic determinant of food security as presented in table 4 indicated significant ($p \leq 0.05$) relationship between years spent in school, household size, number of dependent and food security status (dependent variable),

Table 4: Socio economic determinant of food security (n= 85)

Unstandardized Coefficients			Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	9.522	2.455		3.879	.000
Years spent in school	-.499	.121	-0.426	-4.131	.000
Age of respondent	-.032	.054	-0.081	-.597	.552
Household size	.383	.132	0.433	2.907	.005
Number of dependent	.970	.199	0.720	4.880	.000
Number of income earning member	.431	.358	0.121	1.202	.233
Estimated monthly income	-8.605×10^{-6}	.000	-0.116	-1.001	.320
Average monthly expenditure on non-food items (N)	2.397×10^{-6}	.000	0.011	.109	.914
Years of fishing experience	.085	.046	0.268	1.839	.070
Time spent in fishing (hours)	-.203	.261	-0.073	-.779	.438

R-square = 7.074
Source: Field survey, 2022

Discussion

Achieving food security at the household level is contingent on addressing a number of fishing household socio-economic factors such as educational status, age, household size, marital status etc. (Kuku-Shittu *et al*. 2013; Adelekan and Omotayo 2017). The survey showed that quite a number of the fishers were in the age bracket of 51 – 60, which implies that most of the fishers were not in their youth age which can have effect on their strength towards work. The study reveals that households were predominantly composed of 1-5 persons. This suggests small family size among the fish farmers and consequently, they are likely to rely on hired labour as family members may not be sufficient in fishing activities. This disagrees with the statement of Oluwasola and Ajayi (2013) that in small scale fisheries, the family size is sufficient to sustainably manage the fishing business. In relation to food insecurity, Adepoju and Oyegoke (2018) reported that household size positively related to food insecurity since larger household sizes face higher economic burden in feeding its members. Years of education negatively and significantly influence the probability that a household would be food insecure. This implies that a household becomes less vulnerable to food insecurity with increasing educational attainment which indicated that an educated fishing households have the ability to reason with regards to balanced and nutritious diets for healthy living by maintaining a certain family size and standard of living. This was supported by Bogale and Shimelis, (2009) and Agboola *et al*., (2020). Imperatively, the higher the number of years of schooling, the lowers the probability that a household irrespective of the gender will be exposed to food insecurity. This conforms to other studies (Babatunde *et al*., 2010; Adeyemo and Olajide 2013; Adamu *et al*., 2015; Ogunniyi *et al*., 2016; Olagunju *et al*., 2019; Omotayo 2017), who in their various studies reported that education attainment decreases food insecurity by increasing earning potential and improve occupational and geographical mobility of labour. Higher levels of educational attainment will provide higher levels of welfare (such as food security) for the household.

The study showed that there is significant relationship between household size and food security which implies that the higher the family size the higher the tendency of food insecurity, this could be attributed to higher family responsibilities which may eventually lead to poverty. In consonance with Adekoya (2014), the same trend was found with regards to both depth and severity of food insecurity given the increase in household size. As presented in the result, higher percentage of the fishers relatively experienced very low food security, while very few of them are free from food insecurity, this implies that majority of the fishers have high expenditure when compared with their income and also, have low level of knowledge in income management (Agboola *et al*., 2020). High level of food insecure household in the study areas could lead to low fish production thereby creating a gap between fish production and demand for fish in the country, by widening gap between protein intake and protein availability, posing a threat to the country gross domestic products (GDP) in fisheries sector and national food security. This agrees with studies of Idachaba, (2005) who noted that the growth rate of population is higher than the growth rate of production creating a shortage of food supply. Also, the study is in conformity with Luke *et al.,* (2016) which states that majority of individuals residing in rural environment suffers from food insecurity as a result of income per capita and other factors which include; level of education, household size, income etc.

CONCLUSIONS

From the study, it can be concluded that years spent in school, household size and number of household dependent are major determinants of factors influencing food security status of the fishers in the study area.

RECOMMENDATIONS

Based on the findings from this study, it is recommended that fishing household level of education should be intensified as there is a negative relationship between years spent in school and food security indicating an increase in one factor brings about a decrease in the other factor and vice-versa. Awareness on family planning by government and non-governmental agencies should be improved, since family size is essential in combating food insecurity. Finally, livelihood and income diversification during period of shocks should be

practiced by the fishing household to avoid poverty and starvation.

REFERENCES

Abdul W.O. (2009). Stock Assessment of Tilapias in the Freshwater Ecotype of Ogun Estuary, Ogun State, Nigeria. PhD. Thesis. University of Agriculture, Abeokuta, pp. 50.

Adamu, C.O., Oose, M.O. and Bello, N.A. (2015). Farmers' perception towards organic based vegetable production in Ilaro Agricultural Zone, Ogun State, Nigeria. *International Journal of Applied Agriculture and Apiculture Research*, 11(1–2): 115– 122.

Adelekan, Y.A., and Omotayo, A.O. (2017). Linkage between rural non-farm income and agricultural productivity in Nigeria: A Tobit-two-stage least square regression approach. *The Journal of Developing Areas*. 51(3): 317–333.

Adepoju, A. and Oyegoke, O. (2018). Correlates of food insecurity status of urban households in Ibadan metropolis, Oyo State, Nigeria. *International Food Research Journal* 25: 2248-2254.

Adepoju, A.A. (2019). Effect of social capital assets on poverty alleviation among fish farming households in Oyo state, Nigeria. *Asian journal of Agricultural extension, economics and sociology*, 30(1): pp. 1-14.

Adeyemo, T.A. and Olajide, O.A. (2013). Urban rural pattern of remittances and effects on food security of rural households in Nigeria. In Conference on International Research on Food Security, Natural Resource Management and Rural Development organized by the University of Hohenheim Tropentag 2013, Stuttgart, Germany September 17– 19p.

Adekoya, O.A. (2014). Analysis of farm households poverty status in Ogun states, Nigeria. *Asian Economic and Financial Review*, 4(3), 325.

Agboola, T.O., Akintunde, O.K, Jimoh, I.O and Ajayi, F.O. (2020). Determinants of the food security status of farming households in Lagelu Local Government Area of Oyo State, Nigeria. *Applied Tropical Agriculture* 25(2):84-91.

Andersen, W.C., Turnipseed, S.B., Karbiwnyk, C.M., Lee, R.H., Clark, S.B., Rowe, W.D., Madson, M.R. and Miller, K.E. (2009). Multi residue method for the triphenyl-methane dyes in fish: Malachite green, crystal, violet and brilliant green. *Analytical Chemica Acta* 637(1-2):279-289.

Babatunde, R.O., Adejobi, A.O. and Fakayode, S.B. (2010). Income and calorie intake among farming households in rural Nigeria: results of parametric and nonparametric analysis. *Journal of Agricultural Science*, 2(2):135–146.

Barrett T.J, Tingley M.A, Munkittrick K.R, Lowell R.B. (2009). Dealing with heterogeneous regression slopes in analysis of covariance: new methodology applied to environmental effects monitoring fish survey data. *Environ Monit Assess* (DOI: 10.1007/s10661-009-1001-y).

Benton, T.G. (2017). Food Security Encyclopedia of Applied Sciences (Second Edition), 2:19-22. https://doi.org/10.1016/B978-0-12-394807-6.

Bogale, A and Shimelis, A. (2009). Household level determinant of food insecurity in the rural area of diredawa, eastern Ethiopia. *African Journal of food agriculture nutrition and development* 19(9): 17-27.

Cook, J.I and Frank, D.A. (2008). Food Security, poverty and human development in the United States Annals of the New York Academy of sciences 1136(1):193-209.

FAO, IFAD, WFP. (2015). the state of food insecurity in the world: meeting the 2015 international hunger targets: taking stock of uneven progress. Retrieved 25th April, 2019 from www.fao.org/3/a-i4646.pdf

FAO, IFAD, UNICEF, WFP and WHO. (2022). the state of food security and nutrition in the world 2022. Repurposing food and agricultural policies to make healthy diets affordable. Rome, FAO. https/doi.org/10.4060/cco639en.

FAO, IFAD, UNICEF, WFP and WHO. (2023). the state of food security and nutrition in the world 2023. Urbanization, agri-food systems transformation and healthy diets across the rural-urban continuum. Rome, FAO. https/doi.org/10.4060/cc3017.en.

Gross, A., Boyd, E.C and Wood, C.W. (2000). Nitrogen transformations and balance in channel catfish ponds. *Aquaculture Engineering* 24(1):1-14.

Kuku-Shittu, O., Mathiassen, A., Wadhwa, A., Myles, L., & Akeem, A. (2013). Comprehensive food security and vulnerability analysis: Nigeria. IFPRI Discussion Paper 01275 July 2013.

Idachaba F.S. (2005). Food Security in Nigeria Challenges under Democratic

Dispensation", Paper Presented at ARMTI, Ilorin, Kwara State; 2005.

Katungi, E.M. (2007). Social capital and technology adoption on small farms: The case of banana production technology in Uganda. Diss. University of Pretoria, 2007.

Leroy, B., Delsol, R., Hugueny, B., Meynard, C. N., Barhoumi, C., Barbet-Massin, M., & Bellard, C. (2018). Without quality presence–absence data, discrimination metrics such as TSS can be misleading measures of model performance. *Journal of Biogeography*, 45(9), 1994–2002. https://doi.org/10.1111/jbi.13402.

Liverpool, L. O. and Winter-Nelson, A. (2010). "Poverty Status and the Impact of Formal Credit on Technology Use and Wellbeing among Ethiopian Smallholders". *World Development*, 38(4):541-554.

Liverpool-Tasie, L.S. (2012). Farmer groups, input access and intragroup dynamics: a case study of targeted subsidies in Nigeria. IFPRI Discussion papers No. 1197 pp. VI +26 pp. ref.42.

Ogunniyi, A., Kehinde, O., Salman, K. K. and Ogundipe, A. 2016. Social crisis, terrorism and food poverty dynamics: evidence from Northern Nigeria. *International Journal of Economics and Financial*, Issues 6: 1865–72.

Olagunju, K.O., Ogunniyi, A.I., Awotide, B.A., Adenuga, A.H. and Ashagidigbi, W.M. (2019). Evaluating the distributional impacts of drought-tolerant maize varieties on productivity and welfare outcomes: An instrumental variable quantile treatment effects approach. *Climate and Development* 12(10): 1-11.

Oluwasola, O. and Ajayi, D. (2013). Socio-economic and policy issues determining sustainable fish farming In Nigeria. *International Journal of Livestock Production*. 4(1): 1-8.

Omotayo, A.O. (2017). Economics of farming household's food intake and health-capital in Nigeria: A two-stage Probit regression approach. *The Journal of Developing Areas*, 51(4):109–125.

Oyaniran, T. (2020). Current State of Nigeria Agriculture and Agribusiness sector presented at the AFCTA workshop held in September, 14pp.

Putnam, R. D. (1995). Bowling alone: America's declining social capital. *Journal of Democracy*, *6*, 65–78.