



RURAL HOUSEHOLDS' RESIDENCE STATUS, INCOME SHOCKS, AND FOOD SECURITY INDICATORS IN CONFLICT-AFFECTED NIGERIAN STATES DURING THE COVID-19 PANDEMIC

Abayomi Samuel Oyekale*

Department of Agricultural Economics and Extension, North-West University Mafikeng Campus, Mmabatho 2735, South Africa

* Corresponding author: asoyekale@gmail.com

ARTICLE INFO

Keywords:
COVID-19
Food Security
Insurgencies
Nigeria

Submitted:
14 September 2025
Revised:
12 November 2025
Accepted:
01 December 2025

ABSTRACT

In northern Nigeria, COVID-19 exacerbated existing welfare deprivations and vulnerability already intensified by insurgencies. This study examines the effects of residence status and income shocks on food insecurity experiences (FIE) and households' dietary diversity scores (HDDS) in northern Nigeria. The data were collected from 4,412 households in two non-longitudinal rounds (2021 and 2022) from five conflict-affected states in northern Nigeria. The data were analysed with endogenous treated Poisson regression model. The results showed slight increase in internally displaced households between 2021 and 2022. Average dietary diversity score decreased from 3.94 in 2021 to 3.28 in 2022, while food insecurity experiences slightly increased from 4.29 to 4.28. The Poisson regression showed that FIES increased ($p < 0.05$) with income shocks, while HDDS decreased in response to the shocks. Also, being a permanent resident significantly reduced FIES ($p < 0.05$), while internally displaced persons had higher HDDS. Education and income increased HDDS and reduced FIES. The households who received food assistance had higher FIES, and those who received seeds had higher HDDS ($p < 0.05$). The respondents from Bauchi had significantly higher HDDS and lower FIES. It was concluded that income shocks and displacement adversely affected food security indicators. Therefore, initiatives to promote rural household resilience to income shocks through gender- and state-based livelihood support measures are essential for improving nutrition outcomes.

Cite as:

Oyekale, A. S. (2026). Rural Households' Residence Status, Income Shocks, and Food Security Indicators in Conflict-Affected Nigerian States During the Covid-19 Pandemic. *Jurnal AGRISEP: Kajian Masalah Sosial Ekonomi Pertanian dan Agribisnis*, 25(01), 377–398. <https://doi.org/10.31186/jagriseP.24.01.377-398>

INTRODUCTION

Conflicts are the bane of economic development in some African countries [United Nations Economic Commission for Africa (UNECA), 2024]. Nearly one-third of the African continent is affected by armed non-state actors, such as banditry, insurgency, and religious conflicts (United Nations Economic Commission for Africa [UNECA], 2024). In addition, the number of forcibly displaced persons in Africa is estimated to more than forty-five million in 2024 (African Center for Strategic Studies [ACSS], 2024). Sudan (14.4 million), the Democratic Republic of the Congo (6.5 million), Somalia (4.4 million), and Nigeria (4 million) are among the most affected countries. The Sahel region of Africa has remained a hotspot for cross-border militia activities, many of which have escalated into serious security challenges across the continent (Aning & Atta-Asamoah, 2011; Diarra, 2018; Osland & Erstad, 2020). Boko Haram insurgency is among the fastest-growing extremist groups in Nigeria since 2009, with its major anchors in the northern parts of the country (Awortu, 2015; Erickson, 2019; Nwaka, 2024). This group has claimed responsibility for the bombing of several public places, kidnapping for ransom, and deliberate killing of thousands of civilians in urban and rural areas (Okwuwada, 2023; Sakariyau & Bello, 2024).

Furthermore, conflicts distort households' economic activities and have a significant impact on people's welfare. Specifically, with an estimated 2-3% of Africa's annual Gross Domestic Product (GDP) lost to armed non-state actors, initiatives to curb the excesses of growing insecurity are fundamental to promoting long-term economic stability and development (UNECA, 2024). Nigeria loses approximately \$15 billion annually due to conflict activities that disrupt agricultural production, commodity trading, manufacturing processes, transportation, and oil production (The Nation, 2015). Specifically, it has been estimated that Boko Haram insurgency, banditry, kidnappings, communal violence, and other armed conflicts in Nigeria resulted in approximately \$10.3 billion in economic losses in 2020 (Abdullahi, 2023). This was equivalent to 2.6% of that year's GDP. On a cumulative basis, estimates suggest that conflicts in Nigeria accounted for \$90-113 billion in losses between 2008 and 2021 (United Nations Children's Fund, 2023).

Beyond the conventional scope and dimensions of economic losses associated with conflicts, they also cause significant disruption to social cohesion, thereby promoting institutional weaknesses and increasing prevailing inequalities (Le et al., 2022). More often, internal displacement, forced migration, and loss of livelihoods are associated with conflicts, with significant impacts on household poverty and nutritional status (George & Adelaja, 2022; Akindoyin & Akuche, 2024). These social dimensions underscore the undeniable multidimensional impact of conflict on African economies and household welfare (Prince et al., 2023). Therefore, in the context of exploring the socioeconomic well-being of households in northern Nigeria, the role of other covariate shocks, such as the COVID-19 pandemic, cannot be overemphasized (Pape, 2023).

Specifically, although COVID-19 has had devastating economic impacts in many African countries, households in conflict-affected areas faced multiple deprivations exacerbated by pre-existing insecurity (Ozer et al., 2022). Pandemic-related lockdowns distorted income flows and the productive utilization of national resources (Anyanwu & Salami, 2021; Amewu et al., 2020). The situation in Nigeria was chaotic owing to pre-pandemic economic challenges. Specifically, the collapse of

global oil prices led to an economic recession in 2016, with an annual Gross Domestic Product (GDP) growth of -1.6%. Therefore, COVID-19 surfaced at a time when the Nigerian economy had barely recovered from previous recessions, having recorded 2% GDP growth in 2019 (World Bank, 2019). However, Nigeria witnessed another pandemic-induced contraction in 2020, with a GDP growth of -1.92% (National Bureau of Statistics, 2021).

Furthermore, COVID-19 promoted poverty and unemployment in Nigeria, while major economic development indicators declined (Usman et al., 2024). In northern Nigeria, especially among farming households, the growing problem of insecurity due to the activities of armed non-state actors is a major source of economic shocks. Although existing studies have examined the general effects of COVID-19 on food insecurity in Nigeria (Orjiakor et al., 2023; Balana et al., 2023; Akinleye et al., 2023), limited attention has been paid to how residence status and income shocks influence food security within conflict-affected rural settings.

This study fills a major gap by presenting a case study of rural households facing insurgencies, human displacement, and pandemic conditions (Akpaeti & Umoh, 2015). These shocks are of welfare significance because they promote economic destitution by restricting mobility, destroying social infrastructure and disrupting livelihood activities (Ozer et al., 2022). Moreover, with a focus on food insecurity, this study explores one of the Sustainable Development Goals (SDGs) that is highly emphasized (Onyeaka et al., 2024; Andrianarison, 2022). Food insecurity refers to a situation in which people have limited access to sufficient, safe, and nutritious food to meet their dietary needs and maintain a healthy life. The roles of income shocks precipitated by unforeseen pandemics and unstable residence statuses due to displacement, migration, or temporary relocations cannot be overemphasized. Therefore, this study aimed to analyze the effects of residence status and income shocks on food insecurity indicators in conflict-affected regions of northern Nigeria.

RESEARCH METHOD

Data and Sampling Methods

This study used the first and second rounds of the Data in Emergency (DIEM) surveys conducted by the Food and Agriculture Organization (FAO). The survey was implemented in selected African countries during the COVID-19 pandemic to monitor its impact on rural households' livelihoods and food insecurity. In Nigeria, the first round of surveys was conducted between May and June 2021, and the second round was conducted between June and July 2022. The surveys covered five conflict-affected states: Adamawa, Borno, Zamfara, Yobe, and Katsina. During the first round, 2709 households were interviewed, while 1703 households were sampled during the second round (FAO, 2020). The sampling designs of the two surveys are comparable. However, owing to persisting conflicts, a few enumeration areas in Borno were replaced during the second round.

Analytical Framework

The analytical framework for analyzing household food insecurity in the context of the COVID-19 pandemic or conflicts can be derived from the propositions

of traditional agricultural household models, which emphasize the non-separability of farm household production, consumption, and labor supply decisions (Singh et al., 1986). This framework assumes that while household production decisions can be made independently of their consumption and labor supply decisions, it is not possible to make consumption and labor supply decisions independently of production decisions (Muller, 2014). Within the empirical contexts of rural markets characterized by resource constraints and market imperfections, households jointly make production and consumption decisions (De-Janvry & Sadoulet, 2006). Therefore, production decisions will be made subject to input and price constraints, with ultimate impacts on household consumption (Mendola, 2007; Nelson & Consoli, 2010).

In this setting, farm households are treated as utility maximizers operating under constraints associated with available technology, income, and limited market access (Tacconi et al., 2022). Any shock that affects access to production resources will affect total income, thereby reshaping households' ability to produce sufficient food (Ansah et al., 2021; Munialo & Mellor, 2024). Therefore, recent empirical propositions highlight the pathways through which pandemics or conflicts influence rural households' nutritional outcomes via economic insecurity, income shocks, and coping mechanisms that households adopt (Barrett, 2020).

More importantly, pandemics and conflicts affect the level of food insecurity through their persistent distortion of the main pillars that hold food production and utilization systems (FAO, 2020; High Level Panel of Experts on Food Security and Nutrition [HLPE], 2020; Brinkman & Hendrix, 2011). The primary emphasis has been on the four pillars of food security: availability, accessibility, utilization, and stability (FAO, 2008; Barrett, 2010). Food availability is related to food production, which was affected by COVID-19 through economic lockdowns and inadequate access to production resources (FAO, 2020; Amare et al., 2021). Civil wars and other humanitarian crises also affect food production through human displacement, death of family members, loss of agricultural labor, and income losses through the destruction of crops, livestock, and other means of livelihood (Brinkman & Hendrix, 2011). All of these factors, in turn, affect people's food access, utilization, and stability.

Similarly, the demographic characteristics of households may influence their labor supply and consumption decisions (Tran, 2022). Thus, the empirical strategy highlights the pathways through which livelihood choices and socio-economic characteristics explain variations in household food security outcomes (Mukwedeya & Mudhara, 2023; Stevens et al., 2023). Previous studies have found significant covariates of food insecurity to include income shocks (Quinton et al., 2024; Olanrewaju & Balana, 2023), gender (Ashagidigbi et al., 2022; Otekunrin et al., 2023), education (Ashagidigbi et al., 2022; Otekunrin et al., 2023), human displacement (Abu & Blake, 2024), income, region of residence, age and household size (Ashagidigbi et al., 2022; Otekunrin et al., 2023).

Estimated Model

The data were analyzed using an endogenous treatment effects Poisson regression model. This model is applicable when the dependent variable is a count and the explanatory variable is suspected to be endogenous. More importantly, the

first approach in model selection is to ensure that the data fit properly into the Poisson distribution. This was tested using the *estat gof* command after invoking the conventional *Poisson* command in STATA 17. The statistical insignificance of the deviance goodness-of-fit and Pearson goodness-of-fit ($p > 0.05$) implies that the model is truly Poisson (StataCorp, 2021; Long & Freese, 2014). Specifically, in this study, income shock was endogenous and estimated with agricultural activities and being affected by COVID-19 as instrumental variables because these variables influence income shock but do not directly affect food insecurity outcomes, except through the shock channel (Angrist & Pischke, 2009). The estimated model for the determinants of households' food insecurity experiences (FIE) (equation 1) and its endogenous covariate (equation 2) can be specified using multiplicative error formulation as:

$$FIE_i = \exp(\beta_0 + \sum_{k=1}^{22} X_{ik} \beta_k + \gamma S_i) * \varepsilon_i \dots (1)$$

The estimated model for the determinants of Households' Dietary Diversity Score (HDDS) (equation 3) and its endogenous covariate (equation 4) can also be specified as:

$$S_i = \varphi_0 + X_i \tau_k + \sum_{l=1}^4 I_{il} \varphi_l + \pi_i \dots (2)$$

$$HDDS_i = \exp(\alpha_0 + \sum_{k=1}^{22} X_{ik} \alpha_k + \rho S_i) * \varepsilon_i \dots (3)$$

In the above equations, the dependent variables FIE_i and $HDDS_i$, explanatory variables (X_{ik}), endogenous covariate (S_i) and instrumental variables (I_i) are coded as shown in Table 1.

Table 1. Variables and their coding formats in the estimated models

Variables	Coding format
<i>Dependent variables</i>	
FIE_i	The number of food problems experienced based on the food insecurity experience scale
$HDDS_i$	Household dietary diversity scores
<i>Explanatory variables (X_i)</i>	
Household heads' gender	Male = 1, 0 otherwise
<i>Households' heads education (none is the reference group)</i>	
Basic education	Yes = 1, 0 otherwise
Primary education	Yes = 1, 0 otherwise
Secondary education	Yes = 1, 0 otherwise
Religious or informal	Yes = 1, 0 otherwise
Higher education	Yes = 1, 0 otherwise
<i>Residence type (IDP is reference)</i>	

Variables	Coding format
Permanent resident	Yes = 1, 0 otherwise
Resident migrant	Yes = 1, 0 otherwise
Refugees	Yes = 1, 0 otherwise
Returnees in the past two years	Yes = 1, 0 otherwise
<i>Total income</i>	Naira
Received food	Yes = 1, 0 otherwise
Received cash vouchers	Yes = 1, 0 otherwise
Received seeds	Yes = 1, 0 otherwise
Received extension services	Yes = 1, 0 otherwise
Received livestock feed	Yes = 1, 0 otherwise
<i>States (Adamawa is the reference)</i>	
Borno	Yes = 1, 0 otherwise
Katsina	Yes = 1, 0 otherwise
Yobe	Yes = 1, 0 otherwise
Zamfara	Yes = 1, 0 otherwise
Round	Round 1 = 1, 0 otherwise
Shocks (S_i)	The number of income shocks.
<i>Instrumental Variables (I_i)</i>	
COVID19 constituted economic problem	Yes = 1, 0 otherwise
<i>Agricultural activities (none is the reference group)</i>	
Crop only	Yes = 1, 0 otherwise
Livestock only	Yes = 1, 0 otherwise
Both livestock and crop	Yes = 1, 0 otherwise

In equations 1 and 2, β_0 , β_k , γ , ρ , α_0 , and α_k are the estimated parameters. Also, ε_i and ϵ_i are the stochastic error terms. Multicollinearity among the selected variables was assessed with the Variance Inflation Factor (VIF). The rule of thumb is that further investigation is required when VIF is greater than 4 and multicollinearity is severe when it is more than 10 (Alauddin & Nghiem, 2010).

RESULT AND DISCUSSION

Respondents' Socioeconomic Characteristics

Table 2 shows that household headship in the study areas is male-dominated, with only a small proportion headed by females. Specifically, female headship was lowest in Zamfara (3.50 %) and highest in Borno (9.96 %). This suggests the dominance of males in decision-making, which is consistent with gender norms in African rural communities. Similar findings were reported by Ajadi et al. (2015). The results also reveal a high variability in educational attainment among the respondents. Specifically, more respondents from Adamawa and Katsina possessed higher education, while a lack of formal education was mostly reported by those

from Yobe and Borno. This reflects the persistent educational disparities in northern Nigeria, and Orkar et al., (2020) reported similar results.

The Table further shows that most respondents were permanent residents, although internally displaced persons accounted for 4.78% in Borno. Some states in northern Nigeria are characterized by prolonged insurgencies and banditry. This is consistent with Ajibola (2015), who noted that insecurity is a major development challenge in northern Nigeria. Based on households' primary livelihoods, the results showed that a considerable share of respondents in Zamfara (43.99%) and Adamawa (38.17 %) engaged in crop farming, while livestock production was more prominent in Yobe (40.76%) and Zamfara (30.75%). However, non-farm livelihoods were mostly engaged by respondents in Borno (20.46%) and Katsina (11.06%). The observed livelihood reflects the role of climatic, agroecological, and market conditions in shaping households' choices among different livelihoods. Majekodunmi et al. (2017) supported this notion.

It was also found that 11.06% and 8.84% of the respondents from Borno and Yobe states received food assistance, respectively. However, cash vouchers were mostly received in Zamfara State (5.33%), while Yobe (4.36%) and Borno (3.54%) mostly received seeds. Livestock feeds and extension services were received by a negligible proportion of respondents. These findings suggest that although the Nigerian government implemented some social assistance initiatives during the pandemic, their coverage and adequacy were limited relative to household needs. This is in confirmation with the previous findings of Adeoye et al. (2022) and Isangha et al. (2021).

Table 2. Distribution of Respondents' Demographic Characteristics Across their States

	Adamawa State		Borno State		Katsina State		Yobe State		Zamfara State	
	Freq	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
<i>Gender</i>										
Female	73	8.47	90	9.96	56	5.01	40	4.59	23	3.50
Male	789	91.53	814	90.04	1062	94.99	831	95.41	634	96.50
<i>Education</i>										
None	104	12.06	222	24.56	174	15.56	239	27.44	119	18.11
Basic education	161	18.68	109	12.06	163	14.58	88	10.10	185	28.16
Primary education	20	2.32	13	1.44	13	1.16	18	2.07	6	0.91
Secondary education	104	12.06	89	9.85	143	12.79	101	11.60	58	8.83
Religious or informal	23	2.67	22	2.43	40	3.58	72	8.27	26	3.96
Higher education	450	52.20	449	49.67	585	52.33	353	40.53	263	40.03
<i>Residence type</i>										

	Adamawa State		Borno State		Katsina State		Yobe State		Zamfara State	
Internal Displaced Person (IDP)	10	1.16	43	4.76	13	1.16	4	0.46	4	0.61
Permanent resident	815	94.55	805	89.05	1087	97.23	837	96.10	642	97.72
Resident migrant	25	2.90	34	3.76	15	1.34	19	2.18	10	1.52
Refugees	5	0.58	6	0.66	3	0.27	4	0.46	1	0.15
Returnees in the past two years	7	0.81	16	1.77	0	0.00	7	0.80	0	0.00
<i>Social Assistancess</i>										
Received food	25	2.90	100	11.06	28	2.50	77	8.84	31	4.72
Received cash vouchers	20	2.32	16	1.77	24	2.15	20	2.30	35	5.33
Received seeds	17	1.97	32	3.54	30	2.68	38	4.36	13	1.98
Received extension services	1	0.12	4	0.44	8	0.72	10	1.15	5	0.76
Received livestock feed	2	0.23	6	0.66	4	0.36	4	0.46	7	1.07
<i>Households' agricultural activity</i>										
None	105	12.18	185	20.46	166	14.85	80	9.18	75	11.42
Crop alone	329	38.17	208	23.01	427	38.19	324	37.20	289	43.99
Livestock alone	314	36.43	293	32.41	348	31.13	355	40.76	202	30.75
Both crop and livestock	114	13.23	218	24.12	177	15.83	112	12.86	91	13.85
Unaffected by COVID-19	416	48.26	382	42.26	232	20.75	311	35.71	286	43.53

Respondents' Residence Status, Experiences of Food Insecurity, and Dietary Diversity Scores

Figure 1 shows the distribution of respondents based on their residence status and number of food insecurity experiences. This reveals that 14.52% of the permanent residents did not experience any food insecurity problems. This can be compared to 11.65% for resident migrants and 6.76 for IDPs. In addition, more than half of the respondents experienced five or more food insecurity problems. However, 37.84% and 33.33% of the IDPs and refugees indicated that they had experienced eight food insecurity problems, respectively. This reveals a disproportionate burden of food

problems among households with different residence statuses. The findings are consistent with those of Ekoh et al., (2021) and Anierobi et al., (2024), who emphasized that refugees and IDPs were more affected by the pandemic.

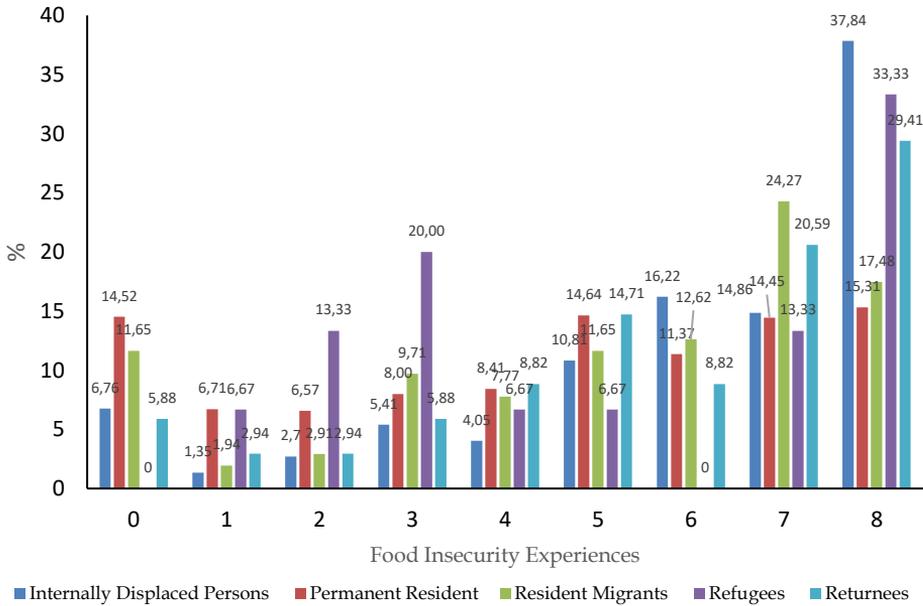


Figure 1. Residence Status and Households’ Experiences of Food Insecurity

Figure 2 further reveals the distribution of respondents’ residence status across their dietary diversity scores. Only one food group was consumed by 32.35% of returnees and 26.21% of resident migrants. However, the majority of respondents consumed four or fewer food groups. The results further showed that six or more food groups were consumed by 25.67% of IDPs, 17.88% of permanent residents, and 17.64% of returnees. These results indicate that residence status is closely associated with dietary diversity, suggesting that displaced populations and returnees face greater challenges in accessing diverse foods. The findings complement those of Morseth et al., (2017), Henjum et al. (2019), and Essayagh et al. (2024) who indicated high risk of nutritional inadequacy among refugees based on low dietary diversity.

Figure 3 presents the distribution of respondents’ income shock exposure across their residence status. The Figure shows that 29.13% of migrants, 25.70% of permanent residents, and 20% of refugees did not experience any income shocks. The results also show that 12.16% of returnees were exposed to seven or more income shocks. IDPs experience higher exposure to income shocks due to displacement-related disruptions in livelihoods, asset loss or destruction, joblessness, and temporary separation from social networks. However, households’ coping ability defines the extent of the impact that these shocks will eventually have on households’ welfare and food security. This is in alignment with the findings of Palacios & Pérez-Uribe (2021) and Kovac et al. (2022) who found that IDPs were among the most vulnerable households.

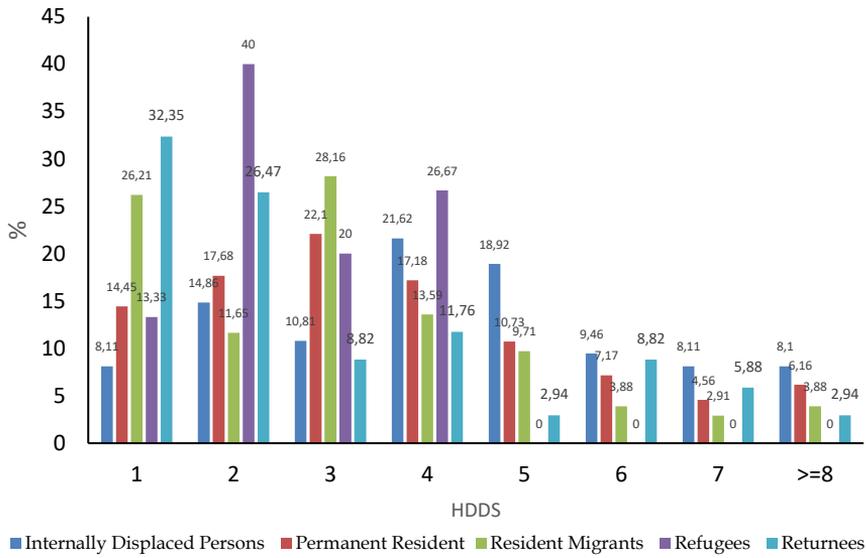


Figure 2. Residence status and households' dietary diversity scores

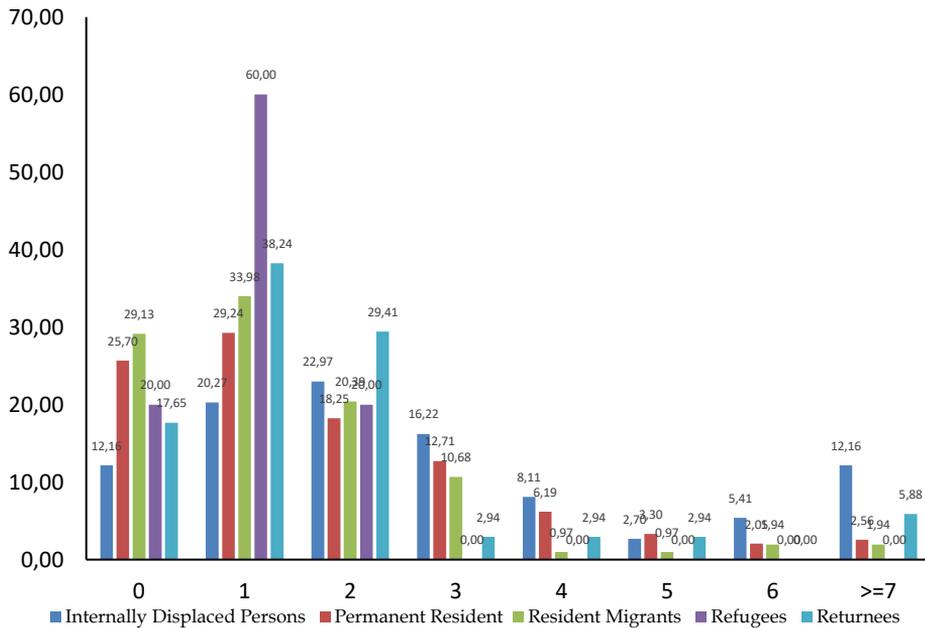


Figure 3. Residence status and households' income shocks exposure

Determinants of Food Insecurity Experience and Dietary Diversity

Table 3 presents the results of the instrumental variable Poisson regression model. This shows that the parameters of income shock variables were statistically significant ($p < 0.01$) in the two models. The results indicate that an increase in income shock increases the expected number of food insecurity experiences (FIE) but decreases the HDDS. These findings are expected because, in the absence of effective coping mechanisms, income shocks adversely affect income generation pathways, thereby decreasing food purchasing power, consumption of nutritious food, and food intake diversity. The magnitude of the impacts of these scenarios is often exacerbated in the contexts of conflict and pandemics, as was the case in the study areas.

These results are consistent with those of previous studies. Specifically, Balana et al., (2023), Kundu et al., (2021), and Martin-Prevel et al., (2012) found that income shocks negatively impact household nutritional outcomes. Additional empirical evidence from Abay et al. (2023) indicates that social protection programs are often insufficient to fully mitigate the negative impacts of income shocks, while Adeoye et al. (2022) and Ansah et al. (2021) suggest that interactions between income shocks and coping strategies further exacerbate food insecurity. Other studies by Olanrewaju & Balana (2023) and Osabohien et al. (2024) similarly emphasize the detrimental impacts of income shocks on food security in conflict-affected settings.

Among the residence status parameters in the FIES model, only permanent residence was statistically significant ($p < 0.05$). This shows that compared to IDPs, permanent residents had a lower expected number of food insecurity experiences. However, the results for HDDS showed that compared to IDPs, permanent resident migrants, refugees, and returnees had a lower expected number of HDDS. These findings emphasize that consistent access to food does not automatically ensure dietary quality or variety, and displacement or migration status affects these outcomes differently. This is also in line with the findings of previous studies. Singh et al. (2017) and Kemei et al. (2023) found that dietary diversity was negatively affected by human displacement. Fayemi et al. (2018) also reported poor nutritional outcomes among internally displaced persons. Similarly, Abu & Blake (2024) found that displaced populations are more vulnerable to food insecurity than resident populations.

The findings also reveal the impacts of conflicts in northern Nigeria and surrounding countries, which often result in migration and asylum seeking, on nutritional food intakes. This is in accordance with the findings of Tambe et al. (2023), Hein et al. (2019), and Metuge et al. (2025). More importantly, although being a permanent resident is expected to enhance dietary diversity, the magnitude of income shocks promoted by the COVID-19 pandemic eroded household income, thereby putting them at par with those in refugee camps. Moreover, in the absence of sustainable livelihoods and given the economic impacts of the COVID-19 pandemic, returnees may find it difficult to cope with pressing economic needs and income losses during the pandemic.

Furthermore, the gender parameter was statistically significant ($p < 0.01$) in the FIES model with a negative sign. This shows that male-headed households had a lower expected number of food insecurity experiences. This reflects pre-pandemic gendered resource allocation in many rural areas, which often favors males. This

finding is in accordance with those of Felker-Kantor & Wood (2012) and Nwaka et al. (2020). In similar contexts, Ashagidigbi et al. (2022) found that female-headed households were more affected by food insecurity, while Otekunrin et al. (2023) emphasized the primary role of gender on food security outcomes. Felker-Kantor & Wood (2012) and Olumba et al. (2023) highlighted inequalities in access to productive resources, which ultimately result in fewer food insecurity problems among male-headed households. Similarly, Ajadi et al. (2015) emphasized the role of cultural norms in shaping rural women's access to productive resources and how these norms moderate their vulnerability to food insecurity. However, Mason et al. (2015) and Mallick & Rafi (2010) reported insignificant differences in food insecurity levels between male- and female-headed households.

In addition, some educational parameters were statistically significant ($p < 0.05$) in both models. Specifically, compared to those with no formal education, attainment of primary, secondary, and higher education reduced the expected number of food insecurity experiences. Similarly, compared to households with heads lacking formal education, those with secondary and higher education had a higher expected HDDS. These findings underscore the pivotal role of education in facilitating household income and promoting relative economic stability during the COVID-19 pandemic. These results are consistent with those of previous studies that found a positive association between formal education and food security (Mutisya et al., 2016; Ashagidigbi et al., 2022; Otekunrin et al., 2023; Gnedeka & Wonyra, 2024). Several authors have argued that education affects food security by improving access to productive resources, enabling engagement in stable income-generating livelihood activities, and enhancing households' adaptive capacity to income shocks (Ajadi et al., 2015; De-Janvry & Sadoulet, 2006).

The parameters of total income in the two models were statistically significant ($p < 0.01$). These results imply that an increase in income will reduce the expected number of food insecurity experiences and increase the HDDS. These findings underscore the role of income as the primary determinant of food security and nutritional adequacy. This underscores the critical role of income as the primary determinant of food security and nutritional adequacy. Beyond home production for household consumption, income remains the main driver of food access, with its steady inflow ensuring food security stability. Similarly, Tambe et al. (2023) highlighted the importance of household income in ensuring adequate food and dietary diversity among internally displaced children, whereas Singh et al. (2017) identified income as a key promoter of improved food security in displacement contexts. Other studies, including those by Ashagidigbi et al. (2022), Otekunrin et al. (2023), Osabohien et al. (2024), and Gnedeka & Wonyra (2024), also found income to be a significant determinant of food security. Additionally, Abay et al. (2023) reported that households with higher baseline incomes exhibit greater resilience in food security during shocks, particularly within social protection contexts.

In addition, the parameters of the receipt of social assistance in the form of food and seeds showed statistical significance ($p < 0.01$) in the FIES and HDDS, respectively. The results indicate that those who received food assistance had a higher expected number of food insecurity experiences, while those who received seeds had a higher expected HDDS. The relative importance of seed provision highlights the potential of interventions that focus on enhancing households'

productive capacities to improve food security and promote long-term resilience rather than short-term humanitarian assistance. As previously observed by Summerton (2020), these findings underscore that social protection did not fully shield some households from food insecurity during the COVID-19 pandemic. Osabohien et al. (2024) also noted that also food security was promoted by social protection during the pandemic, its effectiveness depended on the form and timing of the assistance.

Based on the state of residence, the parameters of Yobe and Zamfara states showed statistical significance with a positive sign in the FIES model. This implies that residents of Yobe and Zamfara states had a higher expected number of food insecurity experiences than those from Adamawa State. However, all state parameters in the HDDS model were statistically significant with a negative sign. These results indicate that respondents from Borno, Katsina, Yobe, and Zamfara states had a lower HDDS than those from Adamawa State. These results highlight the spatial differences in food insecurity across conflict-affected states in Northern Nigeria. Specifically, Boko Haram's activities in northern Nigeria started in Borno State in 2002, although their operations have expanded to many other states (Eme & Ibietan, 2012). Moreover, the triggers of insecurity in Borno State have precipitated the emergence of other radicalization and insurgencies in other states in Nigeria with significant economic consequences. In addition, the estimated parameter for 2021 showed statistical significance with a negative sign in the estimated FIES model. This result implies that the expected number of food insecurity experiences decreased in 2022 compared to 2021. This is expected because the intensity of income losses due to the pandemic eased out with time as lockdowns reduced and people resumed their normal economic activities.

Table 6. Results of Endogenous Exponential Mean Models

Variables	Food Insecurity Experience Scale (FIES)			Households' Dietary Diversity Score (HDDS)		
	Coeff	Robust Std. Err	z-stat	Coeff	Robust Std. Err	z-stat
Shocks	0.0593***	0.0201	2.96	-0.0824***	0.0290	-2.84
Household heads' gender	-0.1046***	0.0321	-3.26	-0.0312	0.0376	-0.83
Households' heads education (none is the reference group)						
Basic education	0.0022	0.0251	0.09	-0.0588	0.0328	-1.79
Primary education	-0.1752**	0.0827	-2.12	0.0439	0.0798	0.55
Secondary education	-0.1076**	0.0463	-2.33	0.0889**	0.0454	1.96
Religious or informal	-0.0729	0.0566	-1.29	0.1135	0.0624	1.82
Higher education	-0.2588***	0.0399	-6.49	0.1785***	0.0372	4.8
Residence type (IDP is reference)						
Permanent resident	-0.1749***	0.0644	-2.72	-0.2773***	0.0766	-3.62
Resident migrant	0.0403	0.0828	0.49	-0.5242***	0.0995	-5.27
Refugees	0.0705	0.1534	0.46	-0.7617***	0.1360	-5.60

Variables	Food Insecurity Experience Scale (FIES)			Households' Dietary Diversity Score (HDDS)		
	Coeff	Robust Std. Err	z-stat	Coeff	Robust Std. Err	z-stat
Returns in the past two years	0.1033	0.1047	0.99	-0.5400***	0.1607	-3.36
total income	-0.0002***	0.0000	-5.72	0.0001***	0.0000	4.40
Received food	0.1531***	0.0313	4.89	-0.0127	0.0399	-0.32
Received cash vouchers	-0.1091	0.0612	-1.78	0.0705	0.0498	1.42
Received seeds	-0.0424	0.0549	-0.77	0.2125***	0.0563	3.78
Received extension services	-0.0786	0.0941	-0.84	-0.2717	0.1756	-1.55
Received livestock feed	-0.0128	0.1305	-0.10	-0.0580	0.1515	-0.38
States (Adamawa is the reference)						
Borno	-0.0346	0.0339	-1.02	-0.1301***	0.0295	-4.40
Katsina	-0.0156	0.0294	-0.53	-0.0795***	0.0257	-3.10
Yobe	0.1158***	0.0278	4.17	-0.2933***	0.0289	-10.16
Zamfara	0.1527***	0.0299	5.11	-0.2711***	0.0311	-8.71
Round 2 (2022)	-0.1010**	0.0391	-2.59	0.0149	0.0344	0.43
Constant	1.9264***	0.1289	14.95	1.7386***	0.1309	13.29

Note: *** - Significant at 1% level ; ** - Significant at 5% level

CONCLUSION

Economic progress and nutritional indicators in northern Nigeria cannot be properly assessed without a clear emphasis on the magnitude of household income shock exposure promoted by different conflict-stimulating phenomena. This study contributes to the existing body of knowledge by precisely emphasizing the impact of households' residence status and income shocks on food security indicators. The findings underscore the roles of income shocks and residence status in advancing different indicators of food insecurity. More specifically, policy interventions should strengthen income-shock mitigation through livelihood diversification, cash transfers, and improved security in rural areas. In addition, social protection must combine short-term relief with support for productive capacity, such as seeds and tools, to enhance dietary diversity and resilience. The findings also underscore the need for targeted measures for IDPs, female-headed households, and conflict-affected populations to ensure food access, nutrition, and equitable resource distribution. Additionally, improving access to education and adult literacy can boost income opportunities, resource management, and resilience to economic and pandemic-related shocks.

AUTHOR CONTRIBUTION STATEMENT

The author was involved in the conceptualization, methodology, data collection, analysis, draft writing, and finalization of the paper.

DECLARATION OF COMPETING INTEREST

The author declares no conflict of interest.

ACKNOWLEDGMENT

The permission that was granted by the FAO to use the dataset is gratefully acknowledged.

ETHIC STATEMENT

No record of ethical approval was found for this data. However, all participants provided their consents before participating in the survey.

REFERENCES

- Abay, K. A., Berhane, G., Hoddinott, J., & Tafere, K. (2023). COVID-19 And Food Security In Ethiopia: Do Social Protection Programs Protect?. *Economic Development and Cultural Change*, 71(2), 373-402. Retrieved from <https://openknowledge.worldbank.org/>
- Abdullahi, A. (2023). Security Challenges In Nigeria And Its Effect On Nigeria's Foreign Image. The Muhammadu Buhari Administration. *Review of Public Administration and Management*, 12(1), 7-11. Retrieved from <https://share.google/ugAjCkUNCY2yIVG8K>
- Abu, H. O., & Blake, M. K. (2024). Characterization Of Food Insecurity Among The Forced Migrants In Northern Nigeria. *Magna Scientia Advanced Research and Reviews*, 10(1), 100-114. doi: 10.30574/msarr.2024.10.1.0007
- Adeoye, A., Okunola, J. L., & Fakunle, S. (2022). Poverty Implications Of COVID-19 And Government Social Protection Programmes In Nigeria. *Journal of Social, Behavioral, and Health Sciences*, 16(1), 242-251. doi: 10.5590/JSBHS.2022.16.1.17
- African Center for Strategic Studies (ACSS) (2024). *Conflicts Causing Record Level of Forced Displacement in Africa*. Retrieved from <https://africacenter.org/spotlight>
- Ajadi, A. A., Oladele, O. I., Ikegami, K., & Tsuruta, T. (2015). Rural Women's Farmers Access To Productive Resources: The Moderating Effect Of Culture Among Nupe And Yoruba In Nigeria. *Agriculture & Food Security*, 4(1), 1-9. doi: 10.1186/s40066-015-0048-y
- Ajibola, O. O. (2015). Terrorism And Insurgency In Northern Nigeria: A Study Of The Origins And Nature Of Boko Haram. *Journal of Law, Policy and Globalization*, 5(12), 1-17. Retrieved from <https://www.semanticscholar.org/>
- Akindoyin, D. I., & Akuche, C. C. (2024). Conflict-Induced Migration and Poverty. *Engagement of Africa in Conflict Dynamics and Peace Architectures*. Retrieved from <https://link.springer.com/chapter>
- Akinleye, S. O., Dauda, R. O. S., Iwegbu, O., & Popogbe, O. O. (2023). Impact of COVID-19 Pandemic On Financial Health And Food Security In Nigeria: A

- Survey-Based Analysis. *Journal of Public Affairs*, 23(2), e2859-e2863. Doi: 10.1002/pa.2859
- Akpaeti, A. J., & Umoh, G. S. (2015). Conflict, Technical Efficiency Of Resource Poor Farmers: A Stochastic Frontier Analysis. *Russian Agricultural Sciences*, 41(1), 299-304. doi: 10.3103/S1068367415040229
- Alauddin, M., & Nghiem, H. S. (2010). Do Instructional Attributes Pose Multicollinearity Problems? An Empirical Exploration. *Economic Analysis and Policy*, 40(3), 351-361. doi: 10.1016/S0313-5926(10)50034-1
- Amare, M., Abay, K. A., Tiberti, L., & Chamberlin, J. (2021). COVID-19 And Food Security: Panel Data Evidence From Nigeria. *Food Policy*, 101(1), 102099-1020111. doi: 10.1016/j.foodpol.2021.102099
- Amewu, S., Asante, S., Pauw, K. and Thurlow, J. (2020). The Economic Costs Of COVID-19 In Sub-Saharan Africa: Insights From A Simulation Exercise For Ghana. *The European Journal of Development Research*, 32(5), 1353-1369. doi: 10.1057/s41287-020-00332-6
- Aminu, T., & Ibrahim, A. (2024). Instigators in Radicalisation of the Upsurge Trends of Armed Banditry in Zamfara State, 2019-2024. *International Journal of Social Science Research and Anthropology*, 5(6), 1-15. Retrieved from <https://taapublications.com/tijsra/article/view/241>
- Andrianarison, F. (2022). Unravelling The Linkage Between Food Security, Poverty Reduction, And Education For Sustainable Development. *The Journal of Development Studies*, 58(11), 2198-2221. doi: 10.1080/00220388.2022.2096445
- Angrist, J. D., & Pischke, J.-S. (2009). *Mostly Harmless Econometrics: An Empiricist's Companion*. Princeton University Press
- Anierobi, C. M., Obasi, C. O., Nnamani, R. G., Ajah, B. O., Iloma, D. O., Efobi, K. O., & Chigbe, E. I. (2024). Communal Conflicts In Nigeria: Assessment Of The Impacts On Internally Displaced Persons And Settlements Amidst COVID-19 Pandemic. *Heliyon*, 10(9), 1-15. doi: 10.1016/j.heliyon.2024.e30200
- Aning, K., & Atta-Asamoah, A. (2011). Military Challenges And Threats In West Africa. *Coping with Global Environmental Change, Disasters and Security: Threats, Challenges, Vulnerabilities and Risks*. Springer Berlin Heidelberg
- Ansah, I. G. K., Gardebroek, C., & Ihle, R. (2021). Shock Interactions, Coping Strategy Choices And Household Food Security. *Climate and Development*, 13(5), 414-426. doi: 10.1080/17565529.2020.1785832
- Anyanwu, J.C. & Salami, A.O. (2021). The Impact Of COVID-19 On African Economies: An Introduction. *African Development Review*, 33(1), 1-16. doi: 10.1111/1467-8268.12531
- Ashagidigbi, W. M., Orilua, O. O., Olagunju, K. A., & Omotayo, A. O. (2022). Gender, Empowerment And Food Security Status Of Households In Nigeria. *Agriculture*, 12(7), 956-967. doi: 10.3390/agriculture12070956
- Awortu, B. E. (2015). Boko Haram Insurgency And The Underdevelopment Of Nigeria. *Research on Humanities and Social Sciences*, 5(6), 213-220. Retrieved from <https://www.semanticscholar.org/paper/>
- Balana, B. B., Ogunniyi, A., Oyeyemi, M., Fasoranti, A., Edeh, H., & Andam, K. (2023). COVID-19, Food Insecurity And Dietary Diversity Of Households: Survey

- Evidence From Nigeria. *Food Security*, 15(1), 219-241. doi: 10.1007/s12571-022-01312-w
- Barrett, C. B. (2010). Measuring Food Insecurity. *Science*, 327(5967), 825-828. doi: 10.1126/science.1182768
- Barrett, C. B. (2020). Actions Now Can Curb Food Systems Fallout From COVID-19. *Nature Food*, 1(6), 319-320. doi: 10.1038/s43016-020-0085-y
- Brinkman, H.-J., & Hendrix, C. S. (2011). *Food Insecurity And Violent Conflict: Causes, Consequences, And Addressing The Challenges*. World Food Programme. Retrieved from <https://www.wfp.org/publications/>
- De-Janvry, A., & Sadoulet, E. (2006). Progress In The Modeling Of Rural Households' Behavior Under Market Failures. *Poverty, inequality and development: Essays in honor of Erik Thorbecke*. Springer US
- Diarra, O. (2018). *Insecurity And Instability In Africa: Assessing The Effectiveness Of Regional Security Cooperation in the Sahel*. Retrieved from <https://apps.dtic.mil/sti/citations/AD1065358>
- Ekoh, P. C., Agbawodikeizu, P. U., George, E. O., Ezulike, C. D., & Okoye, U. O. (2021). More Invisible And Vulnerable: The Impact Of COVID-19 On Older Persons In Displacement In Durumi IDP Camp Abuja, Nigeria. *Quality in Ageing and Older Adults*, 22(3/4), 135-146. doi: 10.1108/QAOA-10-2020-0049
- Elomien, E., Ajayi, O. & Idowu, O. (2022). The 2018 World Poverty Clock Report And Nigeria As "The Poverty Capital Of The World": Changing The Narrative Through Innovation, Leadership And Sustainable Development. *African Renaissance*, 22(1), 375-381. Retrieved from <https://journals.co.za/doi/>
- Eme, O. I., & Ibietan, J. (2012). The Cost Of Boko Haram Activities In Nigeria. *Arabian Journal of Business and Management Review (OMAN Chapter)*, 2(2), 10-32. doi: 10.12816/0002238
- Erickson, S. E. (2019). *Invisible Soldiers: Integration and Motivations of Women within Boko Haram and the Cross-Regional Trends of Female Terrorism*. Doctoral dissertation, Monterey, CA; Naval Postgraduate School
- Essayagh, F., Essayagh, M., Lambaki, A., Naji, A. A., Essayagh, S., & Essayagh, T. (2024). Determinants Associated With Low Dietary Diversity Among Migrants To Morocco: A Cross Sectional Study. *Scientific Reports*, 14(1), 8361-8373. Retrieved from <https://www.nature.com/articles/>
- Fayemi, P. O., Muchenje, V., Yetim, H., & Ahhmed, A. (2018). Targeting The Pains Of Food Insecurity And Malnutrition Among Internally Displaced Persons

- With Nutrient Synergy And Analgesics In Organ Meat. *Food Research International*, 104(1), 48-58. doi: 10.1016/j.foodres.2016.11.038
- Felker-Kantor, E., & Wood, C. H. (2012). Female-Headed Households And Food Insecurity In Brazil. *Food Security*, 4(4), 607-617. doi: 10.1007/s12571-012-0215-y
- Food and Agriculture Organization (FAO). (2008). *An introduction to the basic concepts of food security*. Retrieved from <https://www.fao.org/3/al936e/al936e.pdf>
- Food and Agriculture Organization (FAO). (2020). *Impact Of COVID-19 On Agriculture, Food Systems And Rural Livelihoods In Africa*. Retrieved from <https://doi.org/10.4060/cb2040en>
- Gani, B. S., Olayemi, J. K., & Inoni, O. E. (2019). Livelihood Diversification Strategies And Food Insecurity Status Of Rural Farming Households In North-Eastern Nigeria. *Економика пољопривреде*, 66(1), 281-295. doi: 10.5937/ekoPolj1901281G
- George, J., & Adelaja, A. (2022). Armed Conflicts, Forced Displacement And Food Security In Host Communities. *World Development*, 158(3), 105991-105111. doi: 10.1016/j.worlddev.2022.105991
- Gnedeka, K. T., & Wonyra, K. O. (2024). The Effect Of Formal Education On Food Security In Togo. *Environment, Development and Sustainability*, 1(1), 1-21. doi: 10.21203/rs.3.rs-2479183/v1
- Headey, Derek D. & Ruel, Marie T. (2020). The COVID-19 Nutrition Crisis: What To Expect And How To Protect. International Food Policy Research Institute (IFPRI), 8(1), 1-17. doi: 10.2499/p15738coll2.133762_08.
- Hein, A. K., Hong, S. A., Puckpinyo, A., & Tejativaddhana, P. (2019). Dietary Diversity, Social Support And Stunting Among Children Aged 6-59 Months In An Internally Displaced Persons Camp In Kayin State, Myanmar. *Clinical nutrition research*, 8(4), 307-317. doi: 10.7762/cnr.2019.8.4.307
- Henjum, S., Caswell, B. L., & Terragni, L. (2019). I Feel like I'm Eating Rice 24 Hours a Day, 7 Days a Week: Dietary Diversity among Asylum Seekers Living in Norway. *Nutrients*, 11(10), 2293-22105. doi: 10.3390/nu11102293
- High Level Panel of Experts on Food Security and Nutrition (HLPE). (2020). *Impacts of COVID-19 on food security and nutrition: Developing effective policy responses to address the hunger and malnutrition pandemic* (HLPE Issues Paper). Retrieved from <https://www.fao.org/3/cb1000en/cb1000en.pdf>
- Hirvonen, K., de Brauw, A., & Abate, G. T. (2021). Food Consumption And Food Security During The COVID-19 Pandemic In Addis Ababa. *American Journal of Agricultural Economics*, 103(3), 772-789. doi: 10.1111/ajae.12206
- Isangha, S. O., Choi, W. M. A., & Chiu, M. Y. L. (2021). COVID-19: Where Are The Nigerian Social Workers?. *Qualitative Social Work*, 20(1-2), 343-349. doi: 10.1177/1473325020973336
- Kemei, J., Salami, B., Soboka, M., Gommaa, H. I. M., Okeke-Ihejirika, P., & Lavin, T. (2023). The Forms And Adverse Effects Of Insecurities Among Internally

- Displaced Children In Ethiopia. *BMC Public Health*, 23(1), 200-217. doi: 10.1186/s12889-023-15109-9
- Kovac, D., Efendic, A., & Shapiro, J. N. (2022). *Forced Displacement, Exposure To Conflict And Long-Run Education And Income Inequality: Evidence from Croatia and Bosnia and Herzegovina*. Retrieved from <https://ideas.repec.org/>
- Kundu, S., Al Banna, M. H., Sayeed, A., Sultana, M. S., Brazendale, K., Harris, J., & Khan, M. S. I. (2021). Determinants Of Household Food Security And Dietary Diversity During The COVID-19 Pandemic In Bangladesh. *Public Health Nutrition*, 24(5), 1079-1087. doi: 10.1017/S1368980020005042
- Le, T. H., Bui, M. T., & Uddin, G. S. (2022). Economic And Social Impacts Of Conflict: A Cross-Country Analysis. *Economic Modelling*, 115(1), 105980-105999. doi: 10.1016/j.econmod.2022.105980
- Long, J. S., & Freese, J. (2014). *Regression Models For Categorical Dependent Variables Using Stata (3rd Ed.)*. Stata Press
- Majekodunmi, A. O., Dongkum, C., Langa, T., Shaw, A. P., & Welburn, S. C. (2017). Shifting Livelihood Strategies In Northern Nigeria-Extensified Production And Livelihood Diversification Amongst Fulani Pastoralists. *Pastoralism*, 7(1), 1-13. doi: 10.1186/s13570-017-0091-3
- Mallick, D., & Rafi, M. (2010). Are Female-Headed Households More Food Insecure? Evidence From Bangladesh. *World Development*, 38(4), 593-605. doi: 10.1016/j.worlddev.2009.11.004
- Martin-Prevel, Y., Becquey, E., Tapsoba, S., Castan, F., Coulibaly, D., Fortin, S., & Savy, M. (2012). The 2008 Food Price Crisis Negatively Affected Household Food Security And Dietary Diversity In Urban Burkina Faso. *The Journal of Nutrition*, 142(9), 1748-1755. doi: 10.3945/jn.112.159996
- Mason, R., Ndlovu, P., Parkins, J. R., & Luckert, M. K. (2015). Determinants Of Food Security In Tanzania: Gendered Dimensions Of Household Headship And Control Of Resources. *Agriculture and Human Values*, 32(3), 539-549. doi: 10.1007/s10460-014-9568-5
- Mendola, M. (2007). Farm Household Production Theories: A Review Of "Institutional" And "Behavioral" Responses. *Asian Development Review*, 24(01), 49-68. doi: 10.1142/S0116110507500047
- Metuge, K. N., Tambe, B. A., Djikeng, F. T., Achidi, A. U., Chipili, G., & Mbhenyane, X. G. (2025). Nutritional Vulnerability Of Displaced Persons: A Study Of Food Security And Access In Kumba Municipality, Cameroon. *Challenges*, 16(1), 7-18. doi: 10.3390/challe16010007
- Micheal, V. A., & Abiodun, A. A. (2014). Estimation Of Regression Coefficients In The Presence Of Multicollinearity. *Social and Basic Sciences Research Review*, 2(10), 404-415. Retrieved from <https://www.researchgate.net/>
- Morseth, M. S., Grewal, N. K., Kaasa, I. S., Hatloy, A., Barikmo, I., & Henjum, S. (2017). Dietary Diversity Is Related To Socioeconomic Status Among Adult

- Saharawi Refugees Living In Algeria. *BMC Public Health*, 17(1), 1-9. doi: 10.1186/s12889-017-4527-x
- Mukwedeya, B., & Mudhara, M. (2023). Factors Influencing Livelihood Strategy Choice And Food Security Among Youths In Mashonaland East Province, Zimbabwe. *Heliyon*, 9(4). doi: 10.1016/j.heliyon.2023.e14735
- Muller, C. (2014). A Test Of Separability Of Consumption And Production Decisions Of Farm Households In Ethiopia. Retrieved from <https://shs.hal.science/halshs-00993393/>
- Munialo, C. D., & Mellor, D. D. (2024). A Review Of The Impact Of Social Disruptions On Food Security And Food Choice. *Food Science & Nutrition*, 12(1), 13-23. doi: 10.1002/fsn3.3752
- Mutisya, M., Ngware, M. W., Kabiru, C. W., & Kandala, N. B. (2016). The Effect Of Education On Household Food Security In Two Informal Urban Settlements In Kenya: A Longitudinal Analysis. *Food Security*, 8(1), 743-756. doi: 10.1007/s12571-016-0589-3
- National Bureau of Statistics (NBS) (2020). *Nigerian Gross Domestic Product Report (Q4 & Full Year 2020)*. Retrieved from <https://www.nigerianstat.gov>
- Nelson, R. R., & Consoli, D. (2010). An Evolutionary Theory Of Household Consumption Behavior. *Journal of Evolutionary Economics*, 20(5), 665-687. doi: 10.1007/s00191-010-0171-7
- Nwaka, I. D., Akadiri, S. S., & Uma, K. E. (2020). Gender Of The Family Head And Food Insecurity In Urban And Rural Nigeria. *African Journal of Economic and Management Studies*, 11(3), 381-402. doi: 10.1108/AJEMS-03-2019-0117
- Nwaka, J. C. (2024). In God's Name: Violent Extremism In North East Nigeria. *The Palgrave Handbook of Violence in Africa*. Springer Nature Switzerland
- Okwuwada, N. (2023). *The Modern Day Consequences, Causes, And Nature Of Kidnapping, Terrorism, Banditry, And Violent Crime In Nigeria: A Comprehensive Analysis*. University Library of Munich
- Olanrewaju, O., & Balana, B. B. (2023). Conflict-Induced Shocks And Household Food Security In Nigeria. *Sustainability*, 15(6), 5057-5069. doi: 10.3390/su15065057
- Olumba, C. C., & Okpara, U. (2023). Household Headship, Resource Ownership And Food Security: New Evidence From Southeast Nigerian Cities. *Scientific African*, 22(1), e01974. doi: 10.1016/j.sciaf.2023.e01974
- Onyeaka, H., Ejiohuo, O., Taiwo, O. R., Nnaji, N. D., Odeyemi, O. A., Duan, K., & Odeyemi, O. (2024). The Intersection Of Food Security And Mental Health In The Pursuit Of Sustainable Development Goals. *Nutrients*, 16(13), 2036-2043. doi: 10.3390/nu16132036
- Orjiakor, E. C., Adediran, A., Ugwu, J. O., & Nwachukwu, W. (2023). Household Living Conditions And Food Insecurity In Nigeria: A Longitudinal Study During COVID-19 Pandemic. *BMJ open*, 13(1), e066810. doi: 10.1136/bmjopen-2022-066810
- Orkar, O. M. D., Tyungu, G. T., & Shaminja, T. S. (2020). Examining The Nexus Between Illiteracy and Terrorism In Nigeria: Borno State, North-Eastern, Nigeria, in Perspective. *International journal of Innovative Research and*

- Advanced Studies (IJRAS)*, 7(9), 32-36. Retrieved from https://www.ijiras.com/2020/Vol_7-Issue_9/paper_7.pdf
- Osabohien, R. A., Jaaffar, A. H., Ibrahim, J., Usman, O., Igharo, A. E., & Oyekanmi, A. A. (2024). Socioeconomic Shocks, Social Protection, and Household Food Security Amidst the COVID-19 Pandemic In Africa's Largest Economy. *Plos one*, 19(1), e0293563. doi: 10.1371/journal.pone.0293563
- Osland, K. M., & Erstad, H. U. (2020). The Fragility Dilemma And Divergent Security Complexes In The Sahel. *The International Spectator*, 55(4), 18-36. doi: 10.1080/03932729.2020.1833474
- Otegunrin, O. A., Mukaila, R., & Otegunrin, O. A. (2023). Investigating And Quantifying Food Insecurity In Nigeria: A Systematic Review. *Agriculture*, 13(10), 1873-1885. doi: 10.3390/agriculture13101873
- Ozer, P., Dembele, A., Yameogo, S.S., Hut, E. & de Longueville, F. (2022). The Impact Of COVID-19 On The Living And Survival Conditions Of Internally Displaced Persons In Burkina Faso. *World Development Perspectives*, 25(1), 100393-1004107. doi: 10.1016/j.wdp.2022.100393
- Palacios, P., & Pérez-Uribe, M. A. (2021). The Effects Of Agricultural Income Shocks On Forced Migration: Evidence From Colombia. *Peace Economics, Peace Science and Public Policy*, 27(3), 311-340. doi: 10.1515/peps-2021-0003
- Pape, U. (2023). *Well-Being And Shocks: Challenges In Poverty Measurement And Analysis (Doctoral Dissertation)*. Georg-August-Universität Göttingen. Retrieved from <https://ediss.uni-goettingen.de/handle/11858/14982>
- Prince, A. I., Bello, K. O., Nwimo, C. P., & Collins, O. (2023). The Intersection Of Economic Inequality And Political Conflict In Africa: A Comprehensive Analysis. *International Journal of Social Sciences and Management Research*, 9(6), 69-87. doi: 10.56201/ijssmr.v9.no6.2023.pg69.87
- Quinton, J., Jenkins, G. P., & Olasehinde-Williams, G. (2024). How Do Household Coping Strategies Evolve With Increased Food Insecurity? An Examination Of Nigeria's Food Price Shock Of 2015–2018. *Food and Energy Security*, 13(5), e70012. doi: 10.1002/fes3.70012
- Sakariyau, R. T., & Bello, I. (2024). *Boko Haram and Kidnapping in Nigeria. The Political Economy of Kidnapping and Insecurity in Nigeria: Beyond News and Rumours*. Springer Nature Switzerland
- Singh, I., Squire, L. and Strauss, J., (1986). *Agricultural Household Models: Extensions, Applications, And Policy*. The Johns Hopkins University Press
- Singh, K. P., Hasan, Z., Bhoopathy, S. V., Worth, H., Seale, H., & Richmond, R. L. (2017). A Qualitative Assessment Of Food Security In An Internally Displaced Persons Camp In Kenya. *African Journal of Food, Agriculture, Nutrition and Development*, 17(1), 11832-11832. doi: 10.1017/S1368980015001275
- StataCorp. (2021). *Stata Base Reference Manual Release 17 (Poisson Regression)*. StataCorp LLC
- Stevens, F. R., Gaughan, A. E., Salerno, J., Pricope, N. G., Cassidy, L., Bailey, K., & Mosimane, A. (2023). Empirically Modelling Household Vulnerability And

- Food Security Across A Southern African Land System. *Journal of Land Use Science*, 18(1), 315-333. doi: 10.1080/1747423X.2023.2226140
- Summerton, S. A. (2020). Implications Of The COVID-19 Pandemic For Food Security And Social Protection In India. *Indian Journal of Human Development*, 14(2), 333-339. doi: 10.1177/0973703020944585
- Tacconi, F., Waha, K., Ojeda, J. J., & Leith, P. (2022). Drivers and Constraints Of On-Farm Diversity: A Review. *Agronomy for Sustainable Development*, 42(1), 2-11. Retrieved from <https://link.springer.com/>
- Tambe, A. B., Akeh, M. L., Tendongfor, N., Dhlamini, T., Chipili, G., & Mbhenyane, X. (2023). The Predictors Of Food Security And Dietary Diversity Among Internally Displaced Persons' Children (6-59 Months) In Bamenda Health District, Cameroon. *Conflict and Health*, 17(1), 11-21. Retrieved from <https://link.springer.com/article/10.1186/s13031-023-00511-2>
- The Nation. (2015). *Nigeria Losing \$15bn Yearly To Oil Theft, Experts*. Retrieved from <https://thenationonlineng.net/>
- Tran, N. V. (2022). Understanding Household Consumption Behaviour: What Do We Learn From A Developing Country?. *The BE Journal of Economic Analysis & Policy*, 22(4), 801-858. doi: 10.1515/bejeap-2022-0036
- United Nations Children's Fund. (2023). *The economic cost of conflict in North East Nigeria*. Retrieved from <https://www.unicef.org/>
- United Nations. Economic Commission for Africa (UNECA) (2024). *Socioeconomic Impact Of Conflict In Africa*. Addis Ababa. Retrieved from <https://hdl.handle.net/10855/50100>
- Usman, S. O., Esomchi, O. S., Nasiru, I. M., & Daniel, A. V. (2024). An Assessment Of COVID-19 And Its Impact On Nigeria's Socio-Economic Development. *Cogent Social Sciences*, 10(1), 2306700. doi: 10.1080/23311886.2024.2306700
- World Bank (2024). *Overview*. Retrieved from <https://www.worldbank.org/>
- World Bank Group. (2019). *Nigeria Economic Update, Fall 2019: Jumpstarting Inclusive Growth - Unlocking the Productive Potential of Nigeria's People and Resource Endowments*. Retrieved from <http://hdl.handle.net/10986/32795>