SAHEL INTERNATIONAL JOURNAL OF
ADMINISTRATION AND GOVERNANCE
Volume 1 | Issue 2 | July–December 2026

Economic Shocks and Household Hunger in Northeastern Nigeria: Evidence from the Nigeria General Household Survey (2023–2024)

Elisha Wamarhyel[1] **and Ahmadu U. Sanda**[2]

[1] Northwest University, Sokoto, Nigeria; [2] Usmanu Danfodiyo University, Sokoto, Nigeria
[1] wamarhyelelisha@gmail.com | +234 814 414 8278 [2] ahmadusanda123@gmail.com | +234 803 581 1800

DOI: 10.64290/SIJAG.v1i2.1

Abstract

Households in northeastern Nigeria face overlapping livelihood, market and environmental shocks, yet the relationship between cumulative exposure and household hunger remains insufficiently documented at the regional level. This study examines shock incidence and severity using the northeastern subsample of the Nigeria General Household Survey Panel 2023–2024. Descriptive evidence is combined with eight ordinary least squares specifications incorporating household characteristics and state indicators. The baseline analytical sample contains 814 households, declining to 723 and 565 in specifications requiring additional covariates. Shock incidence is positively associated with the reported hunger score across all four incidence specifications, with coefficients ranging from 0.361 to 0.437. Severity coefficients range from 0.107 to 0.139 and are also consistently positive and statistically significant. Education is negatively associated with hunger, while non-farm enterprise participation is not statistically significant in the fully adjusted models. Bauchi records lower conditional hunger scores than Adamawa throughout the state-adjusted specifications. Associations with female headship and Yobe residence are sensitive to model specification. Farm working hours are positively associated with hunger in the severity models, potentially reflecting distress labour allocation or low returns rather than a protective relationship. These findings support coordinated food-access protection, livelihood recovery and education policies. Interpretation remains associational because the estimates use a single survey wave and do not establish temporal ordering or eliminate unobserved confounding. Measurement documentation, survey-design adjustment and sample-selection checks are necessary before treating the estimates as population-level evidence.

Keywords: *Economic Shocks; Household Hunger; Food Insecurity; Livelihood Vulnerability; Northeastern Nigeria.*

1 Introduction

Food insecurity becomes particularly difficult to address when households experience several disruptions at once. Crop losses can reduce own-produced food, employment losses can interrupt earnings, and rising food prices can erode the purchasing power of the income that remains. Households may respond by borrowing, reducing meals, selling productive assets or increasing work effort. Such responses can sustain immediate consumption while weakening future resilience. Understanding the association between cumulative shocks and food access is therefore central to designing social protection and livelihood policies.

Northeastern Nigeria provides an important setting for this analysis. The region comprises Adamawa, Bauchi, Borno, Gombe, Taraba and Yobe, with substantial differences in livelihood systems, market access and exposure to insecurity. The study considers shocks affecting agricultural production, household income and assets rather than a single narrowly defined macroeconomic disturbance. A household-level approach is necessary because a common regional shock can generate different outcomes depending on education, available labour, enterprise activities and access to support.

The entitlement approach provides the central explanation for these differences. Hunger can arise when households lose the ability to command food through production, exchange, employment or transfers, even where food remains available in markets (Sen, 1981). Food-price increases are especially damaging to net food buyers, although some net sellers may gain (Ivanic & Martin, 2008). Evidence from sub-Saharan Africa also links higher food prices to poverty, reinforcing the importance of purchasing power in understanding vulnerability (Iheonu & Oladipupo, 2024).

Related research considers food-production shocks across Africa, food-security constraints in drylands and the interaction of weather shocks with household well-being. Okunlola and Aregbeshola (2025) examine aggregate production disturbances and hunger, while Feng and Squires (2025) emphasize the interdependence of production, access, institutions and environmental pressures. These contributions establish the relevance of shocks but do not directly identify the conditional association between household shock exposure and the hunger measures used in this northeastern Nigerian sample.

This study addresses three questions. First, how do reported shock incidence and severity vary across the six northeastern states? Second, are higher shock scores associated with higher household hunger scores after controlling for observed household characteristics and state differences? Third, how do education, headship, dependency, non-farm enterprise participation and farm labour relate to hunger within the reported specifications? The analysis uses an initial sample of 814 households and distinguishes descriptive comparisons from regression-adjusted associations.

The contribution is a region-specific synthesis of two shock measures, sequentially adjusted models and geographically differentiated results. It also clarifies the limits of the available evidence: alternative shock scales are not directly comparable in magnitude, changing estimation samples complicate model comparisons, and statistical association does not establish a causal effect. The paper proceeds through the theoretical and empirical literature, methods, results, discussion, policy implications and conclusion.

2 Theoretical framework and related literature

2.1 Entitlements and household access to food

Sen's (1981) entitlement approach locates hunger in the relationship between people and the resources through which they obtain food. Production-based entitlements depend on land, livestock and other productive assets; labour entitlements depend on employment opportunities and remuneration; exchange entitlements depend on relative prices; and transfer entitlements depend on public or private support. A shock can undermine one or several of these channels. This framework explains why food availability alone cannot adequately characterize household vulnerability.

In the present setting, agricultural losses can reduce both food stocks and marketable output. Business losses and unemployment can contract purchasing power, while theft or loss of land can weaken the asset base supporting future consumption. Price increases can compound these effects by reducing the amount of food acquired with a given income. A positive association between cumulative exposure and hunger is therefore theoretically plausible, although the response depends on baseline resources and coping capacity.

Education may improve the ability to obtain information, enter more remunerative employment and navigate assistance programmes. Non-farm enterprises may diversify earnings, but diversification only protects consumption if the additional income is sufficiently stable and profitable. Household headship and dependency may capture differences in access to labour, assets and decision-making rather than biological or demographic effects alone. Consequently, the signs and significance of these variables should be assessed empirically without treating demographic characteristics as deterministic explanations.

2.2 Food prices and livelihood shocks

The welfare consequences of food-price shocks depend on whether households are net buyers or sellers and on the adjustment of wages and production. Ivanic and Martin (2008) show that higher staple prices can benefit some sellers while increasing poverty more frequently than reducing it across their study settings. The implication for northeastern Nigeria is that agricultural participation does not automatically provide protection: a farming household may still purchase more food than it sells or lose output during the same period in which prices rise.

Iheonu and Oladipupo (2024) study food prices and poverty in 37 sub-Saharan African economies over 2001–2020. Their evidence supports concern about deteriorating real purchasing power, but country-level poverty outcomes are not equivalent to household hunger scores. The present study complements that evidence by examining household variation within one Nigerian geopolitical zone. Its composite shock measures, however, do not isolate the contribution of food prices from other disturbances.

2.3 Agricultural and environmental vulnerability

Feng and Squires (2025) describe food insecurity in drylands as a multidimensional challenge involving climate pressures, production systems, supply chains and institutions. Their narrative review supports an integrated interpretation of vulnerability: a production loss can become a food-access crisis when households also face weak markets, limited finance or inadequate protection. It does not supply a household-level causal estimate for northeastern Nigeria, and the current analysis should not be presented as a direct replication.

Okunlola and Aregbeshola (2025) use aggregate African time-series evidence to examine the response of hunger and population growth to food-production shocks. Their distinction between long-run relationships and short-run responses illustrates why different empirical designs can yield different findings without contradiction. Aggregate impulse responses and cross-sectional household coefficients concern different units, outcomes and identifying assumptions. Neither can be substituted for the other when designing geographically targeted interventions.

2.4 Food insecurity and broader household well being

Food insecurity also has consequences beyond contemporaneous consumption. Cole and Tembo (2011) connect food insecurity with poor mental health using panel evidence from rural Zambia. Li et al. (2024), in a working paper on Malawi, examine the relationship between food insecurity and mental health in the presence of weather shocks. These studies motivate attention to cumulative welfare losses but do not directly estimate the shock-to-hunger relationship examined here.

The distinction matters for interpretation. Hunger may reduce productivity and increase the need to work, creating feedback between food access and labour allocation. Enterprise participation can likewise be a response to hardship rather than an external source of protection. These possibilities support cautious interpretation of cross-sectional results and indicate why a positive farm-hours coefficient cannot simply be read as evidence that agricultural work causes hunger.

2.5 Research gap and analytical expectations

The literature motivates a household-level analysis that distinguishes the breadth of shock exposure from reported severity and considers variation in household resources and location. The central expectation is a positive relationship between each shock score and hunger. Education is expected to be negatively associated with hunger, whereas the effects of enterprise participation, dependency, female headship and farm labour remain contingent on local opportunities and constraints. State indicators capture average conditional differences relative to Adamawa; they do not identify the institutional mechanisms producing those differences.

The analysis contributes evidence on these conditional relationships rather than a validated forecasting model. No training–test split, out-of-sample evaluation or predictive accuracy statistics accompany the estimates. Accordingly, the term association is used throughout, and the paper avoids interpreting regression significance as proof of forecasting performance or policy effectiveness.

3 Data and methods

3.1 Data source and analytical sample

The number of observations varies across the regression specifications because of missing values in the variables included in the respective models. The initial specification uses 814 observations, while the number decreases to 723 and 565 in the subsequent specifications. This reduction reflects the availability of complete observations for the variables included in each model. As additional explanatory and control variables are incorporated, observations with missing values in any of the variables required for a particular specification are excluded from the estimation. Consequently, the regression models are estimated using different sample sizes, and the results are interpreted with due consideration of differences in data availability across specifications.

3.2 Measures and operational definitions

Household Hunger

The dependent variable is the household hunger score, denoted by hunger in the regression models. It is constructed as the sum of two components, hung2 and hung3. The first component, hung2, is derived by reversing the coding of the original survey variable, transforming responses on the original 0–7 scale such that the recoded values also range from 0 to 7. The household-level mean of the

recoded responses is subsequently calculated to obtain hung2. Accordingly, its theoretical range is 0–7, with higher values representing higher scores on the recoded measure.

The second component, hung3, is constructed from selected responses of the household questionnaire. Responses coded as 2 are recoded to zero, after which the selected items are summed to obtain the household-level score. The final regression outcome, hunger, is generated by adding hung2 and hung3. Consequently, hunger and hung2 are distinct measures. The descriptive analysis uses hung2, whereas the regression models use the composite measure hunger, which incorporates both components. The theoretical range of the composite measure depends on the response categories and coding of the items used to construct hung3.

Shock Incidence

Shock incidence is measured using shockscore, a composite indicator constructed from 14 selected shock-occurrence items in Section 10 of the Nigeria General Household Survey Panel, Wave 5 (2023–2024). Responses coded as 1 are retained as 1, while responses coded as 2 are recoded to zero. The recoded responses are then summed to obtain the household-level shock-incidence score. Under complete binary coding, the theoretical range is 0–14. A higher score indicates exposure to a greater number of the selected shock items, while a lower score indicates exposure to fewer of these items. The measure captures the incidence of reported shocks rather than the monetary value of losses or the severity of their consequences.

Shock Severity

Shock severity is measured using shockscore2, constructed by summing responses across 19 selected shock-related variables in Section 10 of the household questionnaire. The resulting composite score represents the total of the included responses, with higher values indicating larger aggregate scores across the selected items. Unlike the shock-incidence measure, the theoretical range of shockscore2 depends on the permissible response categories and coding of the individual variables. The severity measure is therefore interpreted in accordance with its construction as a composite indicator of reported shock severity.

3.3 Model specification

For household i, the two regression families are expressed as follows. Covariates enter sequentially according to the specifications reported in Tables 3 and 4; the equations describe the most extensive specification within each family.

$$H_i = \alpha + \beta S_i + \gamma_1 D_i + \gamma_2 F_i + \gamma_3 E_i + \gamma_4 N_i + \Sigma_s \delta_s State_{si} + \varepsilon_i \qquad (1)$$

$$H_i = a + \theta V_i + \lambda_1 D_i + \lambda_2 F_i + \lambda_3 E_i + \lambda_4 N_i + \lambda_5 \ln(L_i) + \Sigma_s \kappa_s State_{si} + u_i \qquad (2)$$

Here H denotes the hunger score; S denotes shock incidence; V denotes shock severity; D is dependency; F indicates female headship; E is average education; N is non-farm enterprise participation; and L is average farm working hours. State indicators sum over the five states other than Adamawa. The intercepts are α and a, and ε and u are disturbance terms. β and θ describe hunger-score differences associated with a one-unit difference in the respective shock measure, conditional on included covariates. They are not percentage changes or percentage-point changes in hunger prevalence.

Each model is estimated by ordinary least squares, consistent with the original analysis. In both families, Model 1 includes the shock measure and dependency; Model 2 adds headship and state indicators. Model 3 adds education in the incidence family and education plus logged farm hours in the severity family. Model 4 adds enterprise participation. These are sequential covariate-adjustment specifications, not separate causal identification strategies.

3.4 Interpretation and analytical limitations

OLS provides an interpretable conditional-mean benchmark, but suitability depends on the outcome's construction and distribution. If the score is bounded, ordinal or a count, alternative estimators may be appropriate after measurement is verified. The supplied output contains no residual diagnostics, heteroskedasticity tests, multicollinearity assessment or influence analysis. No claim that these checks passed is made. Reported significance stars retain their original thresholds: 1%, 5% and 10%.

The design cannot eliminate omitted-variable bias, common reporting error or reverse causality. Wealth, household consumption, displacement, assistance receipt, urban residence, market access and

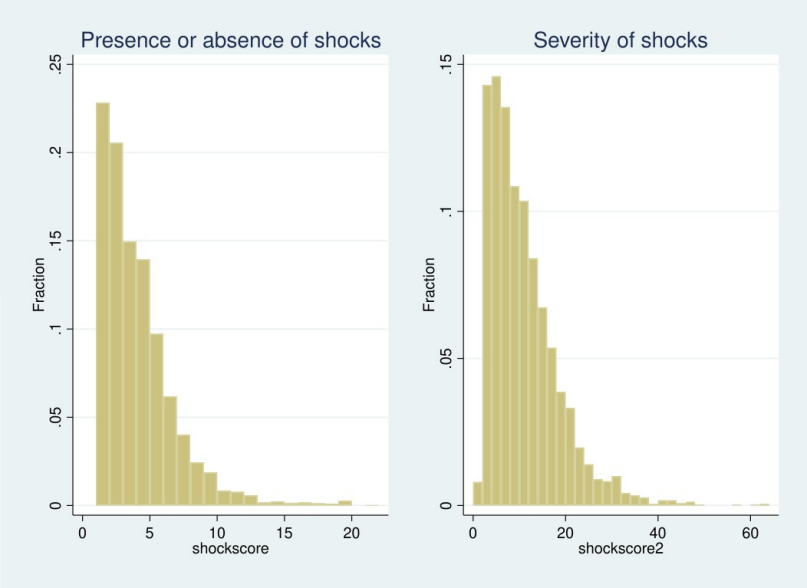
local security may influence both exposure and hunger but are absent from the supplied models. Household labour and enterprise participation may also respond to hunger. Moreover, differences between model coefficients can reflect changing sample composition alongside covariate adjustment. A positive and stable sign is informative, but does not establish a causal dose response or comprehensive robustness.

4 Results

4.1 Distribution of shock exposure

Figure 1 reproduces the distributions supplied in the manuscript. Both measures are right-skewed: observations are concentrated at lower scores, with a smaller number of households reporting much greater exposure. The two axes represent different scales. A severity score of ten cannot be interpreted as ten separate shock events, and its coefficient cannot be compared directly with the incidence coefficient without standardization or a common substantive change in exposure.

Figure 1 Distribution of reported shock incidence and severity



Source: original manuscript graphics. The underlying item-level scores and construction code were not supplied.

Table 1 converts the labelled state-level shock charts into a compact comparison. Yobe records the highest displayed mean incidence score (5.1), closely followed by Bauchi (5.0), while Bauchi has the highest displayed severity score (15.5). Borno has the lowest displayed values on both measures. These are descriptive sample comparisons, with no state-specific sample sizes, standard errors or design-based tests available. They should not be used as a definitive ranking of humanitarian need.

Table 1 Reported mean shock scores by state

State	Incidence score	Severity score
Adamawa	3.9	12.4
Bauchi	5.0	15.5
Borno	2.4	6.0
Gombe	3.0	8.3
Taraba	4.5	13.8
Yobe	5.1	14.6

Note. Values transcribed from labels in the original state-level figure; weighting and state sample sizes were not reported.

4.2 Descriptive hunger scores

The original descriptive figure reports hung2 means ranging from 3.5 in Gombe and Taraba to 4.1 in Yobe. Adamawa records 3.9, Borno 3.7 and Bauchi 3.6. These values correct the original narrative claim that Bauchi has the lowest descriptive mean: the chart shows lower means for Gombe and Taraba. Since the descriptive and regression outcomes are differently labelled, these statistics are not combined into one outcome distribution.

Table 2 Reported descriptive hunger scores by state

State	Displayed mean hung2
Adamawa	3.9
Bauchi	3.6
Borno	3.7
Gombe	3.5
Taraba	3.5
Yobe	4.1

Note. The source chart describes households as poor, but provides no poverty classification rule, subgroup sample sizes or confidence intervals. These are score means, not prevalence percentages.

Within Gombe, the source graphic displays Akko at 2.8, Balanga at 3.8, Billiri at 3.6, Gombe at 3.1, Kwami at 4.0, Nafada at 3.7, Shongom at 4.4 and Yamaltu Deba at 3.7. Akko's displayed value is 2.8, correcting the 2.4 stated in the original prose. These local comparisons are exploratory: without cell sizes and precision estimates, apparent differences cannot establish a reliable local ranking or justify claims about all households within the LGAs.

4.3 Shock incidence and household hunger

Table 3 reports the four incidence specifications. The shock coefficient is positive and significant at the 1% level throughout, increasing from 0.361 in Model 1 to 0.437 in Model 4. In the fully adjusted specification, a one-unit higher incidence score is associated with a 0.437-point higher hunger score, conditional on the included characteristics. The increase across specifications should not be attributed wholly to adjustment because the sample changes between Models 2 and 3.

Table 3. OLS Estimates Using Shock Incidence

Variable	Model 1	Model 2	Model 3	Model 4
Shock incidence	0.361*** (0.053)	0.394*** (0.053)	0.419*** (0.057)	0.437*** (0.059)
Dependency	-0.003 (0.005)	0.004 (0.005)	-0.005 (0.006)	-0.005 (0.006)
Non-farm enterprise participation	—	—	—	-0.265 (0.183)
Average years of education	—	—	-0.149*** (0.038)	-0.150*** (0.038)
Female headship	—	0.857** (0.342)	0.645* (0.369)	0.643* (0.369)
Bauchi	—	-1.830*** (0.309)	-2.148*** (0.329)	-2.246*** (0.335)
Borno	—	0.101 (0.528)	-0.339 (0.631)	-0.283 (0.632)
Gombe	—	-0.081 (0.353)	0.014 (0.362)	0.029 (0.362)
Taraba	—	0.338 (0.379)	0.219 (0.400)	0.184 (0.400)
Yobe	—	-0.625 (0.453)	-0.938* (0.500)	-0.962* (0.500)
Constant	7.380*** (0.274)	7.414*** (0.313)	9.312*** (0.600)	9.449*** (0.607)
Observations	814	814	723	723
R^2	0.055	0.123	0.142	0.145

Source: Authors' estimates using the Nigeria General Household Survey, 2023–2024.

*Notes: Dependent variable: household hunger. Coefficients are estimated using ordinary least squares (OLS). Conventional standard errors are reported in parentheses. The supplied estimation commands do not specify heteroskedasticity-robust, clustered, or survey-design-adjusted standard errors. Adamawa and male headship are the reference categories, subject to confirmation of the underlying coding. A dash indicates that the variable is not included. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.*

Education is negatively associated with hunger in Models 3 and 4, with coefficients of −0.149 and −0.150, respectively, both significant at 1%. Under the stated measurement, an additional year in

household average education is associated with approximately 0.150 fewer hunger-score points in Model 4. This conditional association is consistent with, but does not establish, an entitlement-protecting role for education.

Female headship has a positive coefficient in Models 2–4. The estimate is significant at 5% in Model 2 but only at 10% in Models 3 and 4. Thus, the incidence models suggest a possible disadvantage that becomes less precisely estimated after additional adjustment. Dependency is not statistically significant in any incidence specification, and enterprise participation has a negative but insignificant coefficient of −0.265 in Model 4. Non-significance does not demonstrate that enterprises provide no protection.

Bauchi has a negative coefficient significant at 1% in every state-adjusted model, reaching −2.246 in Model 4 relative to Adamawa. Yobe is negative only at the 10% level in Models 3 and 4; Borno, Gombe and Taraba are not significant at the reported thresholds. The R^2 rises from 0.055 to 0.145, indicating limited explanatory coverage even in the most extensive incidence model. These values concern in-sample fit and do not establish predictive accuracy.

4.4 Shock severity and household hunger

Table 4 reports the severity specifications. Severity coefficients range from 0.107 to 0.139, all significant at 1%. The Model 4 estimate implies a 0.139-point difference in hunger for a one-unit difference in severity, conditional on the included covariates. Incidence and severity coefficients cannot be ranked by absolute size because their underlying units differ. Their common positive signs support directional consistency across two exposure measures.

Table 4. OLS Estimates Using Shock Severity

Variable	Model 1	Model 2	Model 3	Model 4
Shock severity	0.107*** (0.013)	0.133*** (0.013)	0.135*** (0.015)	0.139*** (0.015)
Dependency	-0.003 (0.005)	0.004 (0.005)	-0.003 (0.007)	-0.002 (0.007)
Log farm working hours	—	—	0.348** (0.139)	0.336** (0.139)
Non-farm enterprise participation	—	—	—	-0.229 (0.205)
Average years of education	—	—	-0.131*** (0.041)	-0.133*** (0.041)
Female headship	—	0.813** (0.332)	0.545 (0.431)	0.541 (0.431)
Bauchi	—	-2.096*** (0.302)	-2.442*** (0.348)	-2.509*** (0.353)
Borno	—	0.584 (0.517)	-0.803 (0.706)	-0.719 (0.710)
Gombe	—	0.229 (0.346)	0.586 (0.438)	0.621 (0.439)
Taraba	—	0.353 (0.368)	-0.155 (0.424)	-0.160 (0.424)
Yobe	—	-0.333 (0.434)	-0.527 (0.578)	-0.512 (0.578)
Constant	7.110*** (0.274)	6.898*** (0.310)	7.997*** (0.742)	8.127*** (0.751)
Observations	814	814	565	565
R^2	0.081	0.172	0.225	0.227

Source: Authors' estimates using the Nigeria General Household Survey, 2023–2024.

*Notes: Dependent variable: household hunger. Coefficients are estimated using ordinary least squares (OLS). Conventional standard errors are reported in parentheses. The supplied estimation commands do not specify heteroskedasticity-robust, clustered, or survey-design-adjusted standard errors. Adamawa and male headship are the reference categories, subject to confirmation of the underlying coding. A dash indicates that the variable is not included. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.*

Education remains negatively associated with hunger in Models 3 and 4, at −0.131 and −0.133, respectively, and is significant at 1%. By contrast, female headship is significant in Model 2 but becomes statistically insignificant after education and farm working hours enter. This differs from the weak

significance retained in the incidence models. Consequently, a general claim that female headship is an independently established determinant across all specifications would overstate the evidence.

Logged farm working hours are positively associated with hunger: 0.348 in Model 3 and 0.336 in Model 4, both significant at 5%. In the latter, a 10% difference in working hours corresponds to approximately 0.032 hunger-score points, calculated as 0.336 × ln(1.10), conditional on the stated natural-log transformation. The positive sign contradicts a simple protective interpretation of greater work effort. Low labour productivity, distress work and reverse causality are possible explanations that the current estimates cannot distinguish.

Enterprise participation is again negative and insignificant, with a coefficient of −0.229 in Model 4. Dependency is insignificant throughout. Bauchi retains a negative coefficient significant at 1%, reaching −2.509 in Model 4, whereas Yobe is not statistically significant in this family. R^2 reaches 0.227, but the reduction to 565 households and the addition of farm hours prevent a clean comparison with the incidence models. Greater apparent fit cannot be attributed solely to the severity measure.

5 Discussion

5.1 Cumulative Exposure and Entitlement Vulnerability

The most consistent finding is the positive association between shock exposure and household hunger across both regression families. This supports the entitlement framework, which explains how disruptions to production, earnings and assets can weaken households' ability to obtain food (Sen, 1981). The result is also consistent with the purchasing-power mechanisms discussed by Ivanic and Martin (2008) and Iheonu and Oladipupo (2024), while extending the analysis to multiple household shocks in northeastern Nigeria. However, the composite indicators do not identify which individual shocks contribute most to the observed relationship.

The incidence and severity results indicate that the number and severity of adverse experiences are both relevant to understanding household vulnerability. Nevertheless, their coefficients cannot be compared directly because the measures use different scales and are estimated separately. Further analysis could establish whether the two measures provide complementary information for identifying households at greater risk of hunger.

5.2 Education and Livelihood Diversification

Education is negatively associated with hunger across both regression families. This relationship may reflect greater employment opportunities, improved access to information and increased capacity to respond to economic difficulties. Education may also capture differences in household wealth and social networks. The findings identify education as an important correlate of household food access, although the specific mechanisms underlying this relationship remain uncertain.

Non-farm enterprise participation has negative but statistically insignificant coefficients in the fully adjusted models. This suggests that participation alone does not establish a protective association with household hunger. Enterprise activities may differ in profitability, market access and income stability, making their contribution to food access dependent on the returns they generate. The original explanations involving low productivity and limited finance remain plausible, but these factors were not directly measured. Future research should distinguish between occasional livelihood activities and established businesses by examining earnings, business survival, sector and access to finance.

5.3 Labour Allocation and Demographic Differences

Farm working hours are positively associated with hunger in the severity models. This finding challenges the expectation that greater labour input necessarily improves household food access. Food-insecure households may increase their working hours to compensate for income losses, while low agricultural productivity may limit the returns from additional effort. Hunger may also influence labour allocation, making the direction of the relationship difficult to establish. The finding therefore highlights the importance of improving the returns to labour rather than assuming that increased work automatically strengthens food security.

The relationship between female headship and hunger varies across specifications. Although the incidence models show positive coefficients, their statistical significance weakens in the more extensively adjusted models. In the severity models, female headship becomes statistically insignificant after additional covariates are included. These results do not support a uniform conclusion that female-headed households experience greater hunger under all model specifications. Similarly, the insignificant

dependency coefficients do not imply that household composition is irrelevant to consumption needs; rather, the reported models do not establish a statistically significant relationship for the constructed dependency measure.

5.4 Spatial Variation and Household Vulnerability

Bauchi records the most consistent negative state coefficient relative to Adamawa. This indicates lower conditional hunger scores in Bauchi across the state-adjusted specifications. The finding is notable because Bauchi also records relatively high descriptive shock scores, suggesting that exposure and hunger do not necessarily move together. Differences in household resources, coping strategies and access to food may contribute to this pattern.

The negative Yobe coefficients in the incidence models are not statistically significant in the severity models, while Borno records relatively low descriptive shock scores. These differences indicate variation across states in the reported measures of exposure and hunger. The findings support geographically informed food-security assessment, but state averages alone cannot provide a comprehensive ranking of humanitarian need. Local targeting should therefore combine household evidence with current assessments of food access, livelihood conditions and vulnerability.

6 Policy Implications

First, food-security interventions should address livelihood and income losses alongside production shortfalls. Timely assistance can help households maintain purchasing power following agricultural losses, employment disruptions and asset depletion. Where markets function adequately, cash-based support may help households obtain food; where markets are disrupted, interventions should also address food availability and delivery. The positive associations between shock exposure and hunger reinforce the importance of responding to households facing multiple adversities.

Second, livelihood recovery programmes should emphasise productivity, profitability and income stability rather than participation alone. Agricultural support should address constraints that reduce returns to labour, while enterprise programmes should assess market demand, working capital and business viability. The positive association between farm working hours and hunger, together with the insignificant enterprise coefficients, suggests that greater work effort or participation in economic activities does not necessarily translate into improved food access.

Third, longer-term food-security strategies should incorporate education and the protection of learning opportunities during household crises. Flexible learning arrangements, adult skills development and measures to prevent distress-related school withdrawal may complement immediate assistance. The consistent negative association between education and hunger supports attention to educational opportunities as part of broader livelihood development strategies.

Finally, geographic and demographic targeting should use transparent household-level criteria supported by local evidence. Differences across states and the varying results for female headship indicate the importance of considering household circumstances rather than relying exclusively on broad geographic classifications. Monitoring should distinguish shock exposure, coping responses and food-access outcomes to help ensure that assistance reaches households experiencing substantial vulnerability.

7 Limitations and Priorities for Further Analysis

Several limitations should guide interpretation of the findings. First, the construction of the hunger and shock measures requires fuller documentation. In particular, the descriptive analysis uses a variable labelled hung2, whereas the regressions use hunger. Their relationship should be verified before the measures are treated as equivalent. The item-level scoring and aggregation procedures should also be documented to support reproducibility.

Second, sample sizes differ across specifications, declining from 814 households in the baseline models to 723 in the more adjusted incidence models and 565 in the corresponding severity models. Missing values have been identified as the reason for these reductions, but a detailed accounting of exclusions would help establish their precise contribution. Estimating models on a common sample would also improve comparability across specifications.

Third, the supplied estimation commands do not specify robust, clustered or survey-design-adjusted standard errors. The available results therefore do not establish whether the survey’s weights, stratification and clustering were incorporated. Appropriate adjustments should be applied where

supported by the survey documentation before the estimates are interpreted as representative population-level evidence.

Fourth, the study uses a single survey wave and observational data, limiting its ability to establish temporal ordering or resolve reverse causality and omitted-variable bias. Household wealth, displacement, assistance receipt, market access and local security conditions may influence both shock exposure and hunger. Labour allocation and enterprise participation may also respond to food insecurity.

Finally, the reported analysis does not provide a complete set of diagnostic tests or alternative model estimates, and the state-level descriptive comparisons lack subgroup sample sizes and precision estimates. Further analysis should document the outcome measures, audit missing observations and data merges, conduct common-sample checks, assess relevant regression diagnostics and apply appropriate survey-design adjustments. Earlier survey waves could also support longitudinal analysis where comparable measures are available. Additional information on enterprise earnings, agricultural productivity, transfers, displacement and market access would help clarify the mechanisms underlying the observed relationships.

8 Conclusion

This study examined the relationship between economic shocks and household hunger in northeastern Nigeria. The findings show that both shock incidence and severity are positively associated with hunger scores across the reported regression specifications. Education is consistently associated with lower hunger, whereas non-farm enterprise participation is not statistically significant in the fully adjusted models. Farm working hours are positively associated with hunger in the severity models, and the relationship between female headship and hunger varies across specifications. Bauchi records lower conditional hunger scores than Adamawa in the state-adjusted models.

These findings highlight the importance of protecting households' ability to obtain food when livelihood and market disruptions coincide. Immediate food-access assistance should be complemented by measures that improve agricultural returns, support viable enterprises and protect educational opportunities. Particular attention should be given to the stability and productivity of household livelihoods, since greater labour effort or participation in economic activities does not necessarily guarantee improved food access.

Overall, the study provides evidence of a consistent association between household shock exposure and hunger in the northeastern analytical sample. Improved measurement documentation, sample-comparability checks and appropriate survey-design inference would strengthen the evidence available to guide future food-security research and policy.

References

Cole, S. M., & Tembo, G. (2011). The effect of food insecurity on mental health: Panel evidence from rural Zambia. Social Science & Medicine, 73(7), 1071–1079. https://doi.org/10.1016/j.socscimed.2011.07.012

Feng, H., & Squires, V. R. (2025). Combatting hunger, malnutrition and food insecurity—A scourge of global drylands: A narrative review. Discoveries in Agriculture and Food Sciences, 13(01), 29–41. https://doi.org/10.14738/tnc.1301.18273

Food and Agriculture Organization of the United Nations. (n.d.). About the Food Insecurity Experience Scale (FIES). https://www.fao.org/measuring-hunger/access-to-food/about-the-food-insecurity-experience-scale-(fies)/en

Iheonu, C. O., & Oladipupo, S. A. (2024). Food prices and poverty in Africa. Sustainable Development, 32(3), 2700–2708. https://doi.org/10.1002/sd.2805

Ivanic, M., & Martin, W. (2008). Implications of higher global food prices for poverty in low-income countries. Agricultural Economics, 39(s1), 405–416. https://doi.org/10.1111/j.1574-0862.2008.00347.x

Li, W., Barnor, K., & Kafle, K. (2024, December). Stress under shocks: Food insecurity, weather shocks, and mental health in Malawi [Working paper]. Department of Agricultural Economics, Texas A&M University. https://thedocs.worldbank.org/en/doc/ede46ae29828a9550451e91d718f17cd-0050012024/related/Stress-under-shocks-Food-insecurity-weather-shocks-and-mental-health-in-Malawi-pdf.pdf

National Bureau of Statistics. (2024). Nigeria General Household Survey Panel Wave 5 2023–2024 [Data set]. World Bank Microdata Library. https://microdata.worldbank.org/catalog/6410

Okunlola, A. F., & Aregbeshola, A. R. (2025). Evaluating food production shocks and their effects on population growth and hunger in Africa. Journal of Population and Social Studies, 33, 336–360. https://doi.org/10.25133/JPSSv332025.018

Sen, A. (1981). Poverty and famines: An essay on entitlement and deprivation. Clarendon Press.