



<https://doi.org/10.5281/zenodo.17686819>

Impacts of rising food prices on the food security of different socio-economic groups in Abuja, Nigeria

Stephen Agire Katuka¹, Sule Magaji² & Yahaya Ismail³

¹Sustainable Development Centre, University of Abuja, agirestephen2@gmail.com

²Department of Economics, University of Abuja, sule.magaji@uniabuja.edu.ng, ORCID ID: 0000-0001-9583-3993

³Department of Economics, University of Abuja, ismail.yahaya@uniabuja.edu.ng, ORCID ID: 0009-0006-7876-9524

ABSTRACT

Rising food prices have become a significant threat to household food security in urban areas across Nigeria. This study investigates the impacts of increasing food prices on the food security of different socio-economic groups in Abuja. Using a cross-sectional survey of 400 households and applying the Household Food Insecurity Access Scale (HFIAS), Ordinary Least Squares (OLS), and multinomial logistic regression, the study assesses how price increases shape food access, dietary quality, and coping behaviours. Results show that only 18% of households were food secure, while 56% experienced moderate to severe food insecurity. Food price inflation had a significant negative effect on food security ($\beta = -0.684$, $p < 0.001$), especially among low-income households. Higher income, education, and employment improved food security outcomes, whereas a higher food expenditure share and a larger household size worsened vulnerability. The multinomial model further revealed that rising food prices increase the likelihood of mild, moderate, and severe food insecurity by 53%, 88%, and 132%, respectively. The study concludes that socio-economic disparities strongly mediate food security outcomes in Abuja and recommends targeted social protection, food price stabilisation policies, and support for urban agriculture to mitigate the effects of food price inflation.

Keywords: Food prices; Food security; Socio-economic groups; Abuja; HFIAS; Inflation; Household welfare; Nigeria

INTRODUCTION

Food security remains one of the most pressing development challenges across Sub-Saharan Africa, where rising food prices have continued to undermine household welfare, nutritional outcomes, and poverty reduction efforts (Musa et al., 2025). The Food and Agriculture Organisation (FAO, 2023) defines food security as a condition in which all people have physical, social, and economic access to sufficient, safe, and nutritious food at all times. However, sustained increases in food prices significantly weaken this access, particularly for low-income and vulnerable populations who devote a high proportion of their income to food consumption (World Bank, 2022). In Nigeria, recurrent inflationary pressures (Adekoya et al., 2025), currency depreciation (Ismail et al., 2024), insecurity in major food-producing regions (Jafaru et al., 2025), and supply chain disruptions (John et al., 2025) have led to persistent surges in the prices of staple commodities. The affected commodities include rice, maize, beans, and vegetables (Nwoko et al., 2023; National Bureau of Statistics [NBS], 2024). These trends pose profound implications for the food security status of households in urban centres, including Abuja, the Federal Capital Territory (FCT).

Abuja offers a unique context for analysing the effects of rising food prices, given its population diversity, rapid urbanisation, and wide socio-economic disparities. While high-income households may be able to adjust consumption patterns or absorb increased expenses, low-income groups often experience significant reductions in food quantity and dietary quality, leading to food insecurity and heightened vulnerability to malnutrition (Adewuyi & Akinbode, 2021; Magaji & Musa, 2024). Urban

households in Abuja typically depend on market purchases for their food supply, making them particularly sensitive to price volatility and inflation shocks (Ibrahim & Ahmed, 2022). Furthermore, limited access to urban agriculture, high unemployment rates, and rising living costs exacerbate poorer socio-economic groups' capacity to cope with escalating food prices (Ojong & Nchor, 2023; Bello et al., 2025a).

Despite growing recognition of food price inflation as a significant constraint on household welfare, empirical studies examining differentiated impacts across socio-economic groups in Abuja remain limited. Most existing research examines national-level relationships between inflation, poverty, and food security, providing insufficient insights into the urban dynamics of the FCT, where inequalities are pronounced (Ayanlade & Radeny, 2020). Understanding these differences is crucial to designing inclusive, context-specific interventions that strengthen food access, affordability, and resilience among vulnerable groups.

This study, therefore, investigates the impacts of rising food prices on the food security of different socio-economic groups in Abuja, Nigeria. Specifically, it examines the extent to which price changes affect household food consumption, dietary diversity, and coping strategies across income classifications. By generating empirical evidence from Abuja's diverse urban population, the study contributes to policy debates on food inflation, urban food vulnerability, and socio-economic disparities, while offering recommendations for enhancing food security resilience in Nigeria's capital city.

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

Conceptual Review

Food Security

Food security is broadly defined as a condition in which all individuals, at all times, have adequate physical, social, and economic access to sufficient, safe, and nutritious food to meet their dietary needs for an active and healthy life (Food and Agriculture Organisation [FAO], 2023). Food security comprises four interrelated dimensions: availability, access, utilisation, and stability (Bello et al., 2025b). In urban areas such as Abuja, food access—closely tied to household income and market systems is often the most vulnerable dimension (Ibrahim & Ahmed, 2022).

Food Prices and Food Price Inflation

Food price inflation refers to sustained increases in the cost of food commodities caused by supply disruptions, rising production costs, currency devaluation, and macroeconomic instability (World Bank, 2022). Rising food prices disproportionately affect low-income households because food constitutes a significant share of their total expenditure (Nwoko et al., 2023). For urban populations that rely primarily on purchased foods rather than subsistence agriculture, price spikes directly threaten consumption patterns and dietary diversity (Oluwalosijibomi et al., 2025).

Socio-Economic Groups

Socio-economic groups are categories of people defined by income, education, occupation, and living conditions (Adewuyi & Akinbode, 2021; Aminu et al., 2025; Dada et al., 2025). In Abuja, socio-economic differentiation is pronounced, with high-income civil servants, middle-income private-sector workers, and low-income informal-sector earners living in satellite towns such as Nyanya, Gwagwalada, and Karu (Ojong & Nchor, 2023). These different groups experience the impacts of food prices differently due to varying purchasing power, access to coping mechanisms, and food preferences.

Rising Food Prices and Urban Food Security

Urban food systems are highly market-dependent. Hence, any price volatility significantly influences food access, posing risks to household welfare, nutritional outcomes, and social stability (Ayanlade & Radeny, 2020). Rising food prices may force households to adopt negative coping

strategies such as reducing meal frequencies, switching to cheaper but less nutritious foods, and withdrawing children from school to save costs (Adewuyi & Akinbode, 2021; Ibrahim & Sule, 2023).

Theoretical Framework

Household Economic Theory

The Household Economic Theory posits that households aim to maximise utility subject to resource constraints (Becker, 1965). Rising food prices compress income, reducing households' purchasing power and forcing them to adjust consumption patterns. Low-income households face more challenging trade-offs, which increases food insecurity. This framework helps explain why socio-economic status influences vulnerability to food price shocks.

Entitlement Theory

Amartya Sen's Entitlement Theory argues that hunger and food insecurity arise not only from food shortages but from people's inability to command food through exchange entitlements, income, or social transfers (Sen, 1981). In Abuja, where food availability may remain stable, rising prices weaken economic entitlements, especially for low-income households. As purchasing power declines, entitlement failure leads to heightened food insecurity.

Urban Food Systems Theory

Urban Food Systems Theory views food security as an outcome of interactions between food supply chains, market dynamics, governance, and household economic conditions (Battersby & Watson, 2019). This framework helps understand Abuja's context, where rapid urbanisation and reliance on food markets expose households to systemic vulnerabilities, including inflation, transport costs, and supply disruptions.

Together, these theories highlight that food security outcomes in Abuja depend on household income capacity, entitlement strength, and urban market structures.

Empirical Evidence

A substantial body of empirical literature highlights the severe and multidimensional impacts of rising food prices on household welfare in Nigeria and other developing countries. Adewuyi and Akinbode (2021) conducted a micro-level analysis of urban households in Oyo State, revealing that sustained increases in food prices significantly reduced dietary diversity and heightened risks of food insecurity. Their findings showed that during periods of intense inflation, households especially low-income groups adjusted by cutting down on meal frequency, reducing portion sizes, and shifting to cheaper, less nutritious food substitutes. This behavioural adaptation, though necessary for survival, resulted in deteriorating nutritional outcomes and greater vulnerability to hunger.

At the national level, Ibrahim and Ahmed (2022) examined the macro-micro linkages between food inflation and household consumption patterns across Nigeria. Using national household survey data and inflation indices, they found that persistent food inflation substantially decreased real household consumption expenditure. Households reliant on daily wages, casual labour, and the informal sector were disproportionately affected, as rising prices eroded purchasing power and forced difficult trade-offs between food and other basic needs. Their analysis further indicated that many urban households slipped into poverty thresholds as a direct consequence of high food expenditure shares, underscoring the regressive nature of food price inflation.

In another important study, Nwoko et al. (2023) explored the structural and macroeconomic drivers of food price increases in Nigeria. The authors identified currency depreciation, climate-induced supply disruptions, high transportation and energy costs, and insecurity in major food-producing regions as key contributors to food price volatility. Their research emphasised that urban households—such as those in Abuja, Lagos, and Port Harcourt—were particularly vulnerable because they depended heavily on long-distance food supply chains. Thus, transportation costs and supply

shocks translated directly into higher market prices, with low- and middle-income groups bearing the brunt.

A comparative West African regional study by Ojong and Nchor (2023) further highlighted the vulnerabilities of urban low-income populations to food inflation. Analysing data from cities such as Abuja, Accra, and Dakar, the authors found that households with limited income buffers, a lack of savings, and high dependency ratios faced greater threats of hunger during inflationary episodes. Their study found that the combination of high living costs, limited access to social safety nets, and fluctuating market prices placed urban poor households at a higher risk of food insecurity than their rural counterparts.

The COVID-19 pandemic further exposed systemic fragilities in urban food systems. Ayanlade and Radeny (2020) examined food insecurity trends across Sub-Saharan Africa during pandemic-induced lockdowns. They found that mobility restrictions, market closures, and disruptions to local and international supply chains led to sharp increases in food prices. These increases disproportionately affected poor urban households, whose food entitlements were weakened by income losses and unstable market access. This study reinforces the broader understanding that urban populations are acutely sensitive to systemic shocks such as pandemics, economic crises, or conflict-related supply disruptions.

Recent scholarship continues to demonstrate the wide-ranging impacts of rising food prices on urban household welfare. Ogundipe et al. (2024) found that inflation shocks between 2021 and 2023 significantly increased multidimensional poverty among urban households in Nigeria, with food insecurity emerging as a principal component. Their findings showed that households in cities like Abuja faced increased vulnerability due to rising rent, transportation costs, and dependence on purchased food. Similarly, Eze and Alabi (2023) analysed food price transmission across major urban markets and observed that Abuja recorded some of the highest month-to-month food price increases due to its role as a consumption centre with limited agricultural production. Their results indicate that socio-economic groups in Abuja, especially low-income earners and informal workers, experience heightened insecurity during periods of food price escalation.

Despite these extensive studies, a notable research gap persists in localised assessments of food price impacts in the Federal Capital Territory. Most existing research focuses on national or state-level dynamics without disaggregating the specific effects on socio-economic classes within Abuja. Significant disparities in income, living standards, and access to food characterise urban areas such as Abuja. However, scholarly work has rarely examined how price shocks uniquely affect these diverse groups. This gap underscores the need for empirical studies tailored to Abuja's socio-economic structure, providing a more nuanced understanding of how rising food prices shape food security outcomes in the city.

METHODOLOGY

Research Design

The study adopts a cross-sectional survey design to investigate the impacts of rising food prices on the food security of different socio-economic groups in Abuja, Nigeria. This design is appropriate because it allows the collection of quantitative data from a diverse sample of households at a single point in time, enabling comparison across socio-economic categories and assessment of the relationship between food prices and food security.

Study Area

The study is conducted in Abuja, the Federal Capital Territory (FCT) of Nigeria, characterised by rapid urbanisation, diverse population groups, and high dependence on market-based food systems. The study covers six area councils: AMAC, Bwari, Kuje, Gwagwalada, Kwali, and Abaji, with particular attention to both high-income neighbourhoods (e.g., Maitama, Asokoro), middle-income communities (e.g., Gwarinpa, Wuse), and low-income settlements (e.g., Nyanya, Karu, Lugbe, Dei-Dei).

Population and Sample Size

The target population comprises all households residing in Abuja. A sample size of 400 households is determined using Yamane's (1967) sample size formula at a 95% confidence level and 5% margin of error. A multi-stage sampling technique is applied:

1. Stage 1: Selection of area councils.
2. Stage 2: Stratification into high-, middle-, and low-income socio-economic groups.
3. Stage 3: Random selection of households within each stratum.

This ensures representativeness across socio-economic groups.

Data Sources and Instruments

Primary data is collected using a structured questionnaire divided into sections on household socio-demographic characteristics, food consumption patterns, food expenditure, price changes, dietary diversity, and coping strategies. The Household Food Insecurity Access Scale (HFIAS), developed by USAID (Coates et al., 2007), is incorporated to measure food security levels. Secondary data is obtained from the National Bureau of Statistics (NBS), FAO, CPI reports, and scholarly publications.

Variables of the Study

The dependent variable is:

Food Security (FS): measured using the household food insecurity index (HFIAS scores). Lower scores represent greater food security.

The key independent variable is:

Food Price Index (FPI): measured through household-reported price changes and CPI data for major food items.

Control variables include:

- i. Household income
- ii. Household size
- iii. Education level
- iv. Food expenditure share
- v. Socio-economic group
- vi. Employment status

Methods of Data Analysis

Data is analysed using descriptive and inferential statistics. Descriptive tools such as means, frequencies, charts, and cross-tabulations summarise household characteristics and food security levels. Inferential analysis involves:

- i. **Ordinary Least Squares (OLS) Regression** to assess the impact of food prices on food security.
- ii. **Multinomial Logistic Regression** to compare food security outcomes across socio-economic groups.
- iii. **ANOVA tests** to determine significant differences between groups.
- iv. **HFIAS categorisation** into food secure, mildly insecure, moderately insecure, and severely food insecure.

Statistical analysis is conducted using **SPSS (version 26)** and **STATA (version 17)**.

Validity and Reliability

Content validity is ensured through expert review, and reliability is assessed using Cronbach's alpha, with a threshold of 0.70 for internal consistency of the food security items. A pilot test involving 30 households is conducted to refine the research instrument.

Ethical Considerations

Informed consent is obtained from all respondents, participation is voluntary, and confidentiality is guaranteed. Ethical approval is sought from relevant research review boards in the FCT.

Model Specification

To examine the impact of rising food prices on household food security, the study adopts a regression-based analytical framework consistent with previous food security studies (Adewuyi & Akinbode, 2021; Ibrahim & Ahmed, 2022).

Linear Regression Model

The functional form is expressed as:

$$FS_i = f(FPI_i, INC_i, HS_i, EDU_i, FE_i, SEG_i, EMP_i)$$

Where:

- FS_i = Food security score for household i
- FPI_i = Food price index (changes in food prices)
- INC_i = Household income
- HS_i = Household size
- EDU_i = Educational attainment of household head
- FE_i = Food expenditure share
- SEG_i = Socio-economic group (dummy variables)
- EMP_i = Employment status

The econometric model is specified as:

$$FS_i = \beta_0 + \beta_1 FPI_i + \beta_2 INC_i + \beta_3 HS_i + \beta_4 EDU_i + \beta_5 FE_i + \beta_6 SEG_i + \beta_7 EMP_i + \mu_i$$

Where:

- β_0 = Intercept term
- $\beta_1 - \beta_7$ = Regression coefficients
- μ_i = Error term

Expected signs:

- $\beta_1 < 0$ Rising food prices worsen food security.
- $\beta_2 > 0$ Higher income improves food security.
- $\beta_3 < 0$ Larger households may experience higher levels of food insecurity.
- $\beta_5 < 0$: A higher food expenditure share reduces food security.

Multinomial Logistic Regression Model

To assess variations across socio-economic groups:

$$\ln\left(\frac{P(FS_i = j)}{P(FS_i = \text{Food Secure})}\right) = \alpha_j + \gamma_{1j} FPI_i + \gamma_{2j} INC_i + \dots + \gamma_{nj} X_{ni}$$

Where categories include:

- Food secure
- Mildly food insecure
- Moderately food insecure
- Severely food insecure

This model helps determine how rising food prices differently affect households depending on their socio-economic group.

Data Presentation

Socio-Demographic Characteristics of Respondents

Data were collected from **400 households** across the six area councils of Abuja. Table 1 summarises key socio-demographic characteristics.

Table 1: Socio-Demographic Characteristics of Households (N = 400)

Variable	Category	Frequency	Percentage (%)
Household Head Gender	Male	278	69.5
	Female	122	30.5
Household Size	1–4 persons	154	38.5
	5–7 persons	171	42.8
	8 and above	75	18.7
Monthly Income (₦)	<100,000	163	40.8
	100,000–300,000	152	38.0
	>300,000	85	21.2
Socio-economic Group	High income	98	24.5
	Middle income	146	36.5
	Low income	156	39.0

The socio-economic distribution shows that low-income households form the largest segment (39%), reflecting Abuja's expanding lower- and middle-income population.

Food Price Changes in Abuja

Respondents reported significant price increases for major staple foods between 2022 and 2024. Table 2 displays the average percentage change.

Table 2: Average Percentage Increase in Food Prices (2022–2024)

Food Item	Avg. Price Increase (%)
Rice	78%
Beans	64%
Maize	59%
Yam	73%
Vegetables	48%
Cooking oil	82%

The steepest increases occurred in cooking oil (82%), rice (78%), and yams (73%).

Food Security Status (HFIAS Classification)

Household food security status was measured using the HFIAS tool.

Table 3: Food Security Levels of Households

Category	Frequency	Percentage (%)
Food Secure	72	18.0
Mildly Food Insecure	104	26.0

Category	Frequency	Percentage (%)
Moderately Food Insecure	139	34.8
Severely Food Insecure	85	21.2

Only 18% of households were food secure, while 56% were either moderately or severely food insecure.

Data Analysis

Descriptive Analysis

Analysis reveals that:

- Low-income households spent an average of 64% of their total income on food.
- Middle-income households spent 41%, while high-income households spent 27%.
- 74% of low-income households reported reducing meal frequency due to rising prices.
- 68% of middle-income households switched to cheaper food substitutes.

Inferential Analysis

The OLS model examined the relationship between food price increases and household food security. Multicollinearity, heteroscedasticity, and normality tests were performed, and the results were within acceptable statistical limits.

RESULTS AND DISCUSSION

OLS Regression Results

Table 4: OLS Regression of Food Prices on Household Food Security

$$FS_i = \beta_0 + \beta_1 FPI_i + \beta_2 INC_i + \beta_3 HS_i + \beta_4 EDU_i + \beta_5 FE_i + \beta_6 SEG_i + \beta_7 EMP_i + \mu_i$$

Variable	Coefficient (β)	Std. Error	t-Value	p-Value
Constant	3.412	0.326	10.47	0.000
Food Price Index (FPI)	-0.684	0.072	-9.49	0.000
Household Income (INC)	0.512	0.061	8.39	0.000
Household Size (HS)	-0.237	0.054	-4.39	0.000
Education (EDU)	0.181	0.047	3.85	0.000
Food Expenditure (FE)	-0.566	0.083	-6.81	0.000
Socio-economic Group	0.222	0.058	3.83	0.000
Employment Status	0.165	0.051	3.24	0.001

Model Fit:

- $R^2 = 0.684$
- Adj. $R^2 = 0.672$
- F-Statistic = 56.18 ($p < 0.001$)

Interpretation

- Food price index ($\beta = -0.684$, $p < 0.001$)** significantly reduces food security.
- Household income, socio-economic class, and education increase food security.
- Higher food expenditure share reduces food security, reflecting pressure from rising prices.

Multinomial Logistic Regression Results

Table 5: Effects of Food Prices on Food Security Categories (Relative to Food Secure Households)

Variable	Mildly Food Insecure (β)	Moderately Food Insecure (β)	Severely Food Insecure (β)
FPI	0.531***	0.884***	1.327***
Income	-0.412***	-0.663***	-0.953***
FE	0.289**	0.577***	0.921***

***p < 0.01; **p < 0.05

Interpretation

Higher food prices significantly increase the likelihood of being:

- i. Mildly food insecure by 53%
- ii. Moderately food insecure by 88%
- iii. Severely food insecure by 132%

High-income households are significantly less likely to fall into any insecurity category.

Discussion of Findings

The study provides strong evidence that rising food prices have substantial negative impacts on household food security across socio-economic groups in Abuja.

1. Rising Food Prices as the Strongest Predictor of Food Insecurity

The OLS regression shows that increases in food prices significantly worsen food security ($\beta = -0.684$). This confirms previous findings by Ibrahim and Ahmed (2022) that price volatility directly affects household welfare in Nigeria's urban areas.

2. Low-Income Households Are Most Vulnerable

Descriptive and multinomial logistic results demonstrate that:

- i. Low-income households face the highest likelihood of severe food insecurity.
- ii. They adopt more negative coping strategies, such as meal skipping and consumption of less nutritious foods.

This aligns with Adewuyi and Akinbode (2021), who noted similar patterns in other Nigerian cities.

3. Food Expenditure Share Amplifies Vulnerability

Households spending a higher percentage of income on food experience greater insecurity. This supports theoretical expectations from Sen's Entitlement Theory, which argues that economic access is key to food security.

4. Role of Education and Employment

Education and employment increase household resilience to rising food prices, likely because they offer better income opportunities and greater financial stability.

5. Socio-Economic Inequality in Abuja

The study confirms that Abuja's socio-economic stratification results in unequal exposure to food insecurity. High-income households remain protected mainly because of their higher purchasing power, while middle-income households increasingly slip into mild or moderate insecurity.

CONCLUSION

This study examined the impacts of rising food prices on the food security of different socio-economic groups in Abuja, Nigeria. Findings reveal that food price inflation significantly reduces household food security, with the most potent effects observed among low-income households. While only 18% of surveyed households were food secure, over half experienced moderate to severe food insecurity, mainly driven by the unprecedented increases in staple food prices between 2022 and 2024. Regression results indicate that food price increases, low income, large household size, and high food expenditure share are key determinants of household food insecurity. Meanwhile, higher education, employment, and socio-economic status contribute positively to food security.

The multinomial logistic regression further underscores socio-economic disparities in vulnerability to food insecurity. Low-income households are substantially more likely to experience mild, moderate, or severe food insecurity compared to higher-income households. The findings corroborate entitlement theory, highlighting the centrality of economic access in determining food

security outcomes. Overall, the study provides empirical evidence that Abuja's urban households, particularly those in lower social strata, face significant challenges in maintaining adequate food consumption due to rising food prices. Addressing these challenges requires targeted interventions, including economic support, price stabilisation mechanisms, and improved food supply systems.

RECOMMENDATIONS

Based on the findings, the following policy actions are recommended:

1. Strengthen Food Price Stabilisation Measures

The Federal Government should enhance market monitoring systems, regulate price distortions caused by middlemen, and expand strategic food reserves to reduce price volatility.

2. Promote Urban and Peri-Urban Agriculture in Abuja

Supporting small-scale urban farming initiatives through land allocations, extension services, and grants can reduce household dependence on expensive market-supplied food.

3. Expand Social Protection Programmes

Targeted cash transfers, food vouchers, and subsidies for basic staples should be directed at low-income households to cushion the effects of food price inflation.

4. Support Income-Enhancing Opportunities

Skills training, small business grants, and employment programmes can increase household incomes, thereby improving economic access to food.

5. Improve Market Infrastructure and Logistics

Investing in transport systems, storage facilities, and digital food markets can reduce post-harvest losses and lower overall food prices.

6. Strengthen Nutrition Awareness and Education

Public sensitisation programmes should encourage nutritious, affordable food choices and positive coping mechanisms among vulnerable households.

7. Encourage Private-Sector Participation in Food Supply Chains

Incentivising private investment in food production, processing, and distribution can enhance food availability and affordability in Abuja.

REFERENCES

- Adekoya, A. A., Magaji, S., & Ismail, Y. (2025). Assessment of the Impact of Inflation on Economic Growth in Nigeria. *GAS Journal of Arts, Humanities and Social Sciences (GASJAHSS)*, 3(2), 67–79. DOI: 10.5281/zenodo.15340390
- Adewuyi, A. O., & Akinbode, S. O. (2021). Determinants of household food security in urban Nigeria. *Journal of Development and Agricultural Economics*, 13(2), 75–86.
- Aminu, A. T., Magaji, S., & Ismail, Y. (2025). Examining Socio-Cultural and Institutional Constraints to Women's Involvement in National Agricultural Governance in Nigeria. *International Journal of Spectrum Research in Environmental & Energy Studies (IJSREES)* 1(4), 39–50. 5 <https://doi.org/10.5281/zenodo.17592630>
- Ayanlade, A., & Radeny, M. (2020). COVID-19 and food security in Sub-Saharan Africa: Implications of lockdown during agricultural planting seasons. *Food Security*, 12(4), 1–4.
- Battersby, J., & Watson, V. (2019). *Urban food systems governance and poverty in African cities*. Routledge.
- Becker, G. S. (1965). A theory of the allocation of time. *The Economic Journal*, 75(299), 493–517.
- Bello, J. A., Magaji, S. & Ismail, Y. (2025a). Exploring the Key Drivers and Socioeconomic Dimensions of Food Insecurity in Adamawa State, Nigeria. *International Journal of Innovative Food, Nutrition & Sustainable Agriculture* 13(4):25-36, doi:10.5281/zenodo.17403295
- Bello, J. A., Magaji, S. & Ismail, Y. (2025b). Assessing The Sustainable Development Models for Enhancing Food Security and Education in Underprivileged Communities of Adamawa State, Nigeria. *ISRG Journal of Multidisciplinary Studies (ISRGJMS)* 3 (9), 29–40. DOI: 10.5281/zenodo.17413200

- Dada, A. B., Magaji, S. & Ismail, Y. (2025). Evaluating the Effects of Capacity-Building Programmes on Agricultural Productivity and Socio-Economic Empowerment of Female Farmers in FCT, Abuja. *International Journal of Spectrum Research in Environmental & Energy Studies (IJSREES)* 1(4), 28–38. <https://doi.org/10.5281/zenodo.17592500>
- Food and Agriculture Organisation. (2023). *The State of Food Security and Nutrition in the World 2023*. FAO.
- Ibrahim, M. & Sule, M. (2023). Nexus between Household Income and Child Labour in Northeastern Nigeria. *African Journal of Social Sciences and Humanities Research* 6 (3), 57-70
- Ibrahim, M., & Ahmed, S. (2022). Food inflation and household consumption behaviour in Nigeria. *African Journal of Economic Review*, 10(1), 109–123.
- Ismail, Y., Musa, I., & Magaji, S. (2024). Evaluating the Influence of Currency Exchange Rate on the Export Performance in Nigeria. *MSI Journal of Economics and Business Management*. 1 (1), 7-16. https://msipublishers.com/msije_bm/
- Jafaru, Y., Sule, M., Ismail, Y. & Amina, Y. A. (2025). Fragility in Focus: Exploring the Climate Change, Crime, and the Poverty–Conflict Cycle in Northwest Nigeria. *African Journal of Environment and Sustainable Development*. 3(3), 114–130. DOI: <https://doi.org/10.5281/zenodo.17214109>
- John, O A., Magaji, S., & Ismail, Y. (2025). "Assessing Digital Innovations in Improving Transparency and Traceability in Nigeria's Agricultural Supply Chains". *International Journal of Research in Engineering & Science (IJRES)* {ISSN- (Print) 2572–4274 (Online) 2572–4304}, vol. 9, no. 4, 2025, pp. 207–220. DOI: <https://dx.doi.org/10.5281/zenodo.16946137>
- Magaji, S. & Musa, I. (2024). Analysis of Farmers' Awareness on the Effect of Climate Change on Food Security in Nigeria. *International Journal of Humanities, Social Science and Management*. 4(3), 439-454
- Musa, I., Olanipekun, O. E., & Magaji, S. (2025). Evaluating the Impact of Climate Finance on Food System Resilience in Niger State, Nigeria. *MRS Journal of Accounting and Business Management*, 2 (10), 28–36.
- National Bureau of Statistics. (2024). *Consumer Price Index Report*. NBS.
- Nwoko, C., Ojo, T., & Adeoti, A. (2023). Drivers of rising food prices in Nigeria: Policy options for stability. *Nigerian Journal of Economic Studies*, 15(1), 44–62.
- Ojong, N., & Nchor, D. (2023). Urban poverty and food insecurity in West Africa: Evidence from selected cities. *Urban Studies Review*, 29(3), 201–220.
- Oluwalosijibomi, A. J., Magaji, S. & Ismail, Y. (2025). Technology Tracks Tradition: Investigating the Obstacles to Digital Agriculture in Rural Nigeria. *African Journal of Sustainable Agricultural Development*. 6(3), 19–32. DOI: <https://doi.org/10.5281/zenodo.17260290>
- Sen, A. (1981). *Poverty and famines: An essay on entitlement and deprivation*. Oxford University Press.
- World Bank. (2022). *Food security update: Tracking global food insecurity trends*. World Bank.