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Impact of Food Security on Households' Welfare in Nigeria

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Highlights

- **Food insecurity significantly reduces household welfare in Nigeria.**
- **Income deprivation intensifies welfare losses alongside food shortage.**
- **Positive perceptions of economic governance improve welfare outcomes.**

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Abstract

This study examines the impact of food security on household welfare in Nigeria, using data from Afrobarometer Wave 9. Welfare is proxied by respondent's perceived living conditions, while food security is measured by the frequency of going without food. Additional controls include income deprivation, perceptions of government economic management, a multidimensional deprivation index, and demographic and spatial characteristics. A generalized ordered logistic regression model (gologit2) is employed to account for the ordinal nature of welfare and to relax the proportional-odds assumption for covariates that violate it. The results indicate that food insecurity has a significant and negative impact on household welfare across all model specifications. Respondents who frequently go without food are substantially less likely to report satisfactory living conditions, confirming the welfare-depressing effect of hunger. Similarly, lack of cash income significantly reduces perceived welfare, whereas favorable perceptions of government economic management improve outcomes. Education, particularly secondary attainment, enhances welfare, while employment effects vary across thresholds. Spatial disparities persist, with respondents in the South East and South South zones reporting lower welfare relative to the North Central region. The findings underscore that food security is a critical determinant of well-being in Nigeria, influencing both material and subjective dimensions of welfare. Policy interventions should prioritize improving food access, stabilizing household incomes, and strengthening governance to bolster economic confidence. Region-specific programs and targeted social protection measures are essential to achieve inclusive and sustainable welfare improvements.

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1. Introduction

Food security is increasingly understood not just as access to sufficient calories, but as a multidimensional concept with profound implications for overall well-being, quality of life, and welfare. Internationally, this recognition is embedded in the United Nations' Sustainable Development Goals, mainly SDG 2 (Zero Hunger) and SDG 3 (Good Health and Well-being), reflecting the idea that consistent access to adequate, safe, and nutritious food is essential for human welfare. Over the past few decades, a growing empirical literature has documented strong negative associations between food insecurity and welfare outcomes globally. For example, a cross-national study using data from 138 countries (Gallup World Poll) found that moderate or severe food insecurity is strongly associated with worse physical health, lower subjective well-being, and poorer living condition indicators, even after controlling for income and demographic variables (Frongillo et al., 2017). Similarly, Raufhon Salahodjaev & Mirziyoyeva (2021) investigated the Link between Food Security and Life Satisfaction using panel data from 105 countries. The findings demonstrate that increased food insecurity leads to quantitatively significant declines in life satisfaction, findings that are robust to country-level fixed effects and institutional controls.

A substantial and diverse body of empirical research consistently demonstrates that food insecurity exerts strong and multidimensional adverse effects on welfare across global contexts, encompassing declines in physical health, subjective well-being, living conditions, psychosocial functioning, and cognitive outcomes. Evidence from sub-Saharan Africa illustrates these patterns clearly for example, a longitudinal show that food insecurity predicts increases in depressive symptoms, loneliness, poor sleep quality, and reduced life satisfaction (Pengpid & Peltzer, 2024), while repeated exposure among Ethiopian adolescents is associated with deteriorations in self-rated health over time (Jebena et al., 2017). Similarly, the welfare consequences of food insecurity intensified during the COVID-19 pandemic, as demonstrated in Nigeria where food insecurity rose sharply and was strongly associated with declines in non-monetary well-being (Orjiakor et al., 2023). Additionally, a multi-country evidence further highlights the cognitive and mental health dimensions of these effects, with severe food insecurity linked to subjective cognitive complaints among older adults in multiple LMICs largely through stress, sleep disruptions, and depressive symptoms (Smith et al., 2023), and adolescent food insecurity during the pandemic in Indonesia associated with increased depressive symptoms even after adjusting for socioeconomic covariates (Asrullah et al., 2024). Collectively, these studies show that (i) food insecurity is consistently associated with both subjective (life satisfaction, self-rated health) and objective (physical, mental, cognitive health) welfare outcomes; (ii) the frequency and severity of food insecurity episodes shape the magnitude of these effects; and (iii) these relationships persist even after accounting for income, education, employment, and demographic characteristics, suggesting both independent and mediating pathways through stress, deprivation, and health.

Despite extensive global evidence linking food insecurity to welfare, important empirical gaps remain for Nigeria. First, few studies employ nationally representative data that capture the *frequency* of going without food, a measure that more precisely reflects the intensity of food insecurity experienced by households. Second, existing Nigerian studies typically use binary or categorical welfare measures and standard ordered logistic models, even when the proportional-odds assumption is violated. By applying a generalized ordered logistic model, this study produces more reliable estimates that allow the effects of food insecurity to vary across welfare thresholds. Third, the analysis integrates a multidimensional deprivation index alongside income, demographic, and geographic factors, enabling a more comprehensive assessment of overlapping disadvantages that shape household welfare. Finally, the focus on the most recent Afrobarometer Wave 9 survey enhances policy relevance in a period marked by high inflation, economic volatility, and post-COVID food system disruptions. Together, these features provide a more nuanced and context-specific understanding of how food insecurity influences welfare outcomes in Nigeria.

This paper aims to build on this evidence by using *Afrobarometer Wave 9* data for Nigeria to specifically examine how often going without food influences welfare, as measured by present living conditions, while controlling for multiple dimensions of deprivation (monetary, material, demographic, geographic). The specific objectives are:

i. To analyze how food security influences the quality of life in Nigeria.
ii. To provide policy recommendations aimed at improving food security and enhancing welfare in Nigeria.

By focusing on the frequency with which respondents go without food rather than a simple binary indicator, this study employs a measure that better captures the intensity of food insecurity as it is experienced. The use of a nationally representative survey (Afrobarometer Wave 9) allows for heterogeneity analysis across regions, urban–rural locations, and socio-economic groups. Measuring welfare through present living conditions complements prior studies that rely primarily on subjective well-being or health indicators. The inclusion of a multidimensional deprivation index aligns with contemporary welfare frameworks recognizing that food insecurity often coexists with other material and non-material disadvantages. These features, combined with the recency of the data, strengthen the policy relevance of the findings in light of Nigeria's inflationary pressures and post-COVID food system disruptions.

The rest of the paper proceeds as follows. Section 2 reviews relevant theoretical and empirical literature on food insecurity and welfare. Section 3 describes the data, measurement of key variables, explanation of deprivation index construction, and the econometric strategy. Section 4 presents empirical findings, including marginal effects and robustness checks. Section 5 discusses conclusions and the policy implications and provides concluding comments.

2. Literature Review and Theoretical Framework

2.1 Literature Review

Over the past three decades, a large body of global empirical work has established strong associations between food insecurity and diverse welfare outcomes, including material, psychological, and subjective well-being. Food insecurity has been shown to reduce life satisfaction in cross-country analyses using a panel data study across 105 countries (2012–2019), as demonstrated by Raufhon Salahodjaev & Mirziyoyeva (2021). They found that increases in food insecurity (instrumented using natural disasters) significantly reduce life satisfaction, even after controlling for GDP growth, governance, and institutional quality.

Similarly, analyses using the Gallup World Poll data (covering over 100 countries) by Frongillo et al. (2017) show that individuals who report food insecurity have substantially worse outcomes in subjective well-being, worse physical health, poorer housing, and income and employment conditions, compared to food-secure counterparts. Another dimension of inequality of well-being has also been linked to food insecurity. In a study put forward by Smith & Wesselbaum (2022) covering 135 countries, higher food insecurity is associated not only with lower mean well-being but also with greater variance (unequal well-being) among individuals. These global findings collectively underscore that food insecurity is not just a matter of nutrition or diet but is deeply interwoven with broader welfare, affecting subjective assessments of quality of life, psychological stress, and material living conditions.

Furthermore, within Sub-Saharan Africa (SSA), several studies have focused on more specific welfare outcomes. One primary focus is health: for example, a survey conducted by Beyene (2023) covering many SSA nations finds that undernourishment increases infant mortality and reduces life expectancy; conversely, improvements in dietary energy availability are strongly associated with better health outcomes. Another strand addresses livelihood and coping strategies. Research in rural farming households in SSA has shown that households diversify livelihoods (non-farm income, migration, off-farm work) as buffers against food insecurity, and these strategies influence their welfare outcomes (income stability, food consumption, psychological stress). Though many studies are localized, their findings suggest strong linkages: frequent shocks (like droughts, price instability) that disrupt food security worsen welfare via multiple pathways. Hence, global-SSA studies also reveal that the impact of food insecurity extends beyond immediate health or nutrition deficits, negatively affecting subjective well-being, mental health, emotional stress, and the capability to pursue education or employment. These studies provide empirical justification for examining the welfare consequences of food insecurity in multiple dimensions, not just income or nutrition.

In Nigeria, empirical research has predominantly addressed nutritional impacts (malnutrition, stunting, wasting), dietary diversity, determinants of food insecurity, and the socioeconomics of food access. For instance, Titilope et al (2024) put forward a systematic review of households with children under five,

which found that food insecurity is strongly linked to higher rates of stunting, wasting, and underweight among children. Poverty, unemployment, large household size, and low maternal education are repeatedly cited as contributing factors. Ogwumike, Ajimuda, and Aribatise (2020) used national survey data (HNLSS 2009/2010) and found that households in rural and northern Nigeria are more likely to be food insecure; higher education and income reduce the odds of food insecurity. A recent policy-oriented study by Ajetunmobi (2024) on the socio-economic impact of food insecurity on the vulnerable population in Nigeria. It highlights how food insecurity affects poverty, health, productivity, and social exclusion among women, children, and the elderly. In a separate study, Faniyi & Adekunle (2025) address food insecurity in Nigeria, map coping strategies, and show that food insecurity is more concentrated in rural areas. Strategies include changing diets, reducing meal frequencies, and buying food on credit.

However, only a few studies in Nigeria have directly linked the frequency with which households or individuals go without food (rather than more generic binary or categorical measures of food insecurity) to broader welfare indicators such as present living conditions, perceived quality of life, or non-food deprivation. Many works focus narrowly on either nutrition or poverty, rather than integrating them into a fuller welfare framework.

2.2 Theoretical Framework

The study is anchored in two interrelated theories: the Basic Needs Theory and the Capability Approach. The Basic Needs Theory (Streeten, 1979; Deaton & Muellbauer, 1997) posits that welfare depends on the satisfaction of essential human needs such as food, shelter, and health. Under this framework, food security is a foundational element of well-being. A lack of access to adequate food signifies deprivation that directly reduces welfare. This theory implies that ensuring food availability and affordability is a prerequisite for achieving higher levels of welfare and poverty reduction.

The Capability Approach, pioneered by Sen (1999), extends the welfare analysis beyond material needs to focus on individuals' capabilities and their fundamental freedoms to live the lives they value. From this perspective, food security enhances welfare not only by satisfying nutritional requirements but also by expanding people's functional capabilities, such as the ability to work, learn, and participate in social life. Deprivations in food access constrain these capabilities, thereby diminishing overall welfare.

Together, these frameworks justify examining food security as both a determinant and dimension of welfare. They support the empirical strategy of analyzing how the frequency of going without food affects perceived living conditions, while controlling for other socioeconomic factors such as income

access, employment, and education.

3. Data and Methods

3.1 Sources of Data

The study employs data from Round 9 of the Afrobarometer Survey for Nigeria. Afrobarometer is a cross-national, comparative survey that collects high-quality micro-level data on citizens' socio-economic conditions, attitudes toward governance, and lived experiences across African countries. The Round 9 dataset contains nationally representative information on demographics, economic conditions, and welfare indicators. The sample includes adult respondents aged 18 years and above, covering both urban and rural areas across Nigeria's six geopolitical zones. The initial sample in the survey consisted of 1,600 respondents. After removing observations with missing values on key variables including present living conditions (dependent variable), income deprivation, and specifically deprivation index the estimation sample was automatically reduced to 1,245. This listwise deletion approach aligns with Afrobarometer data-quality protocols and ensures consistent sample use across all model specifications. After cleaning for missing observations, the analytical sample consists of all respondents with valid responses to key variables, including perceived living conditions, frequency of going without food, and control variables. Sampling weights provided by Afrobarometer are applied to ensure representativeness.

3.2 Variable Description

3.2.1 Dependent Variable: Welfare

Welfare is proxied by present living conditions, which reflect respondents' subjective assessment of their overall living standards. In the Afrobarometer dataset, this variable is ordinal, typically coded as: 1 = Very bad, 2 = Fairly bad, 3 = Neither good nor bad, 4 = Fairly good, 5 = Very good. Given its ordered nature, the dependent variable satisfies the requirement for an ordered response model (Greene, 2018).

3.2.2 Independent Variable: Food Security

Food security is measured using the question, "How often, if ever, have you or anyone in your family gone without enough food to eat?" Responses are coded as: 0 = Never, 1 = Just once or twice, 2 = Several times, 3 = Many times, 4 = Always. A higher value implies greater food insecurity. This measure captures both the frequency and intensity of food deprivation, which is an advantage over binary classifications that merely distinguish between secure and insecure households (Headey & Ecker, 2013; Leroy et al., 2015).

3.2.3 Control Variables

The study includes several control variables based on economic and socio-demographic literature linking them to welfare (Beegle et al., 2016; Durojaiye, 2021). This include Gone without cash: frequency of lacking cash income for daily

needs (ordinal); Managing the economy: perception of how well the government manages the economy (categorical); Deprivation index: a composite index constructed from multiple non-food indicators (availability of critical services and facilities in the primary sampling unit such as access to clean water, electricity, medical care, and school attendance); Age: continuous variable representing respondent's age in years; Employment status: categorical (employed, unemployed, student, or out of labour force); Educational attainment: ordinal, from "no formal education" to "tertiary education"; Residence: binary (1 = rural, 0 = urban); and Geopolitical zone: categorical variable representing the six zones (North Central, North East, North West, South East, South South, and South West).

3.3 Construction of the Deprivation Index

The deprivation index was constructed using 18 indicators capturing access to essential services, community facilities, and basic socioeconomic infrastructure within the respondent's enumeration area (EA). The indicators cover three dimensions: (i) Services (e.g., water, electricity, sanitation, waste disposal, etc), (ii) Community facilities (e.g., health centres, schools, police post, markets, etc), and (iii) Socioeconomic conditions (e.g., presence of security services, communication services, transport services, etc). Each indicator is coded as a binary variable in the main dataset taking the value 1 if the service/facility is available in the EA and 0 otherwise. The index is computed as the simple average of the 18 binary indicators:

$$deprivation = \frac{(EA\_SVC\_A + --- + EA\_SEC\_E)}{18} \quad (1)$$

This produces a continuous index ranging from 0 (no basic services/facilities available or absolute deprivation) to 1 (all services/facilities available).

For ease of interpretation in the regression model, the continuous index was then transformed into a binary deprivation variable based on observed distribution thresholds. Areas with an index value below 0.50 (0 to 0.49) were classified as "high deprivation" (coded as 0), while areas with values between 0.50 and 0.83 were classified as "moderate deprivation" (coded as 1). This recoding follows:$0 \leq index \leq 0.49 \rightarrow 0; 0.5 \leq index \leq 0.83 \rightarrow 1$

This approach produces a deprivation measure that captures the extent of material and infrastructural disadvantage at the community level, consistent with multidimensional deprivation frameworks used in welfare and poverty analysis. Also, because the deprivation index represents the proportion of essential services and facilities available in an enumeration area, a value below 0.50 indicates that fewer than half of these basic amenities are present, which we classify as 'high deprivation.' Values at or above 0.50 indicate that more than half of essential services are available, reflecting 'moderate deprivation.' Very high values (above 0.83) were rare in the dataset, making it impractical to construct a separate 'low deprivation' category.

3.4 Model Specification

Given that the dependent variable (welfare) is ordinal rather than continuous, the study employs the Generalized Ordered Logistic Regression Model (GOLM) implemented through the *gologit2* procedure with its autofit option. The use of gologit2 is appropriate because we suspect a violation of the Proportional Odds (PO) Assumption and allows coefficients to vary across thresholds only for those variables that violate the parallel-lines assumption, while constraining others to satisfy it (Williams, 2006). The generalized ordered logit model relaxes the PO constraint for variables that violate it, while maintaining it for those that satisfy it, thereby improving model flexibility and efficiency (Williams, 2006; Fu, 1998; Liu & Powers, 2007). This approach yields a partial proportional odds model, preserving interpretability and parsimony, in contrast to a fully unconstrained ordered logit, while relaxing overly restrictive assumptions. The general model is expressed in a simplified form following Angrist & Evans (1998), Bjorvant & Farzanegan (2012), Duflo (2001), Miguel & Kremer (2004), Farzanegan, et al, (2020), and Farzanegan & Thum (2020) as:

$$\text{welfare}_i = \propto_0 + \propto_1 \text{fs}_i + \propto_2 \text{economic}_i + \propto_3 \text{demo}_i + \propto_4 \text{socio}_i + \propto_5 \text{spatia}_i + \mu_i \quad (2)$$

Where:

welfare = latent dependent variable as explained above

fs = food security

economic = control variables, including managing economy, income inequality, and deprivation index

demo = control variables including age and household size

socio = control variables including employment status and educational qualification

spatia = control variables including residence and geographical zones

$\propto_{is}$ = coefficients of estimates

μ = error term

3.5 Estimation Strategy

The study estimates the effect of food security on subjective welfare using a generalized ordered logistic regression model, which accommodates the ordinal nature of the dependent variable while relaxing the proportional-odds assumption for covariates that violate it (Williams, 2006). A standard ordered logit model was first fitted and the Brant Test (Brant, 1990) was conducted to assess the parallel-lines assumption (see appendix 1 and 2). The covariates found to violate proportionality were subsequently estimated within the gologit2 framework, allowing their effects to vary across welfare thresholds, while retaining proportionality for variables that satisfy the assumption. This approach provides robust estimates of the relationship between food security and welfare, accounting for the ordinal outcome structure and potential heterogeneity in covariate effects. The estimated coefficients are interpreted in terms of their sign and magnitude,

reflecting the direction and strength of the association between food security and the likelihood of reporting higher welfare levels.

The generalized ordered logit model (gologit2) is preferred for analyzing ordinal outcomes because it offers flexibility, efficiency, and robustness compared to standard ordered or multinomial logit models. Unlike the conventional ordered logit, which assumes that the effect of each covariate is constant across all thresholds (proportional-odds assumption), gologit2 allows coefficients to vary only for variables that violate this assumption, producing a partial proportional odds model that balances parsimony and flexibility (Williams, 2006; Long & Freese, 2014; Peterson & Harrell, 1990). Also, unlike multinomial logit models, which ignore the natural ordering of the dependent variable and require estimating a large number of parameters, gologit2 leverages the ordinal structure to yield more efficient and interpretable estimates, particularly for policy-relevant outcomes such as welfare (Greene, 2018). Moreover, gologit2 provides consistent maximum likelihood estimates even when proportionality is violated (Allison, 1999; Williams, 2006) and is compatible with standard diagnostic tests, such as the Brant test, allowing empirical verification of which variables satisfy the proportional-odds assumption. Overall, gologit2 combines econometric rigor with practical applicability, making it well-suited for modelling complex ordinal outcomes.

4. Discussion of Results

4.1 Descriptive Statistics of Respondents Distribution

Table 1 presents the summary statistics of key household characteristics, specifically the age of respondents and household size. These statistics provide initial insight into the demographic composition of the sample and its relevance to food security and welfare outcomes in Nigeria. The mean age of respondents is about 35 years, with ages ranging from 18 to 88 years. This suggests that the sample is dominated by agile individuals in their economically active years, reflecting a relatively young population consistent with Nigeria's demographic structure. The age distribution suggests that a significant number of respondents are within the productive age bracket, which is crucial for determining household food security and welfare outcomes. Younger adults are typically more engaged in the labor force and agricultural activities, but may also face income instability, particularly in informal sectors (Beegle et al., 2016; Durojaiye, 2021). Hence, age may influence welfare both directly through income generation and indirectly through its impact on access to food and other basic needs.

Table 1. Summary Statistics of Household Characteristics

Variable	Observation	Mean	Std. dev.	Min	Max
Age	1,598	34.8373	3.331875	18	88
Household Size	1,600	1 2.54746	2.093017	1	18

Source: *Authors' Computation Using Nigeria Afro Barometer (2023)*

The average household size is about 13 persons, with sizes ranging from 1 to 18 members. This indicates that Nigerian households tend to be large and extended, a typical pattern in sub-Saharan Africa (Headey & Ecker, 2013; FAO, 2023). Large household sizes can exert dual effects on welfare and food security. On one hand, they may provide social and labor support that can enhance food production and income diversification, particularly in agrarian communities. On the other hand, large households are often associated with higher dependency ratios, which can stretch limited resources, increase per capita food requirements, and heighten the risk of food insecurity (Smith & Haddad, 2015; Leroy et al., 2015).

From a welfare perspective, households with many dependents may struggle to maintain adequate living conditions if income and employment opportunities are insufficient to meet the needs of all members. This dynamic has been documented in prior studies linking household size to welfare and poverty in Nigeria and similar contexts (Akinbode & Adeola, 2017; Ogwumike et al., 2020).

In summary, the descriptive results highlight two important socio-demographic features of Nigerian households: a youthful population and large household sizes, both of which have significant implications for food security and welfare. The youthful structure provides potential for economic productivity, but the prevalence of large households could exacerbate food access challenges, especially in contexts of limited employment opportunities and rising food prices. These preliminary findings justify the inclusion of age and household size as control variables in the subsequent regression analysis examining the relationship between food security and welfare.

4.2 Socioeconomic Characteristics of the Respondents

Table 2 summarizes the socioeconomic distribution of respondents in the study sample, highlighting gender composition, employment status, and educational attainment. These characteristics are critical determinants of both food security and welfare outcomes, as they influence households' access to income, resources, and coping mechanisms. The results indicate a balanced gender composition, with statistics indicating a near 50/50 distribution of male and female respondents. This near parity ensures a fair representation of both genders in the analysis and aligns with the population structure of Nigeria. Gender balance in the sample is essential given that food security experiences often differ between men and women due to disparities in access to land, credit, and employment opportunities (Smith & Haddad, 2015; Nguyen et al., 2022). Women are typically more vulnerable to food insecurity because of gendered roles in food provisioning and limited control over productive resources, which can directly affect household welfare (FAO, 2023). Therefore, the gender dimension remains central to understanding the welfare effects of food insecurity, as explored later in the gender-disaggregated models.

Regarding the employment status, about 48% of respondents are either full-time or part-time workers. Conversely, nearly 52% of respondents are either unemployed or not actively seeking work. This high unemployment and underemployment rate underscores the fragility of the Nigerian labor market and

reflects the structural economic challenges confronting households. Limited and unstable employment opportunities constrain income generation, increase the risk of food deprivation, and reduce subjective welfare (Beegle et al., 2016; Headey & Ecker, 2013). Unemployment, especially when combined with inflationary pressures and weak social protection, exacerbates household vulnerability to food insecurity, a primary welfare concern highlighted in Nigeria's national development reports (Durojaiye, 2021; Ogwumike et al., 2020).

Table 2. Socioeconomic Characteristics of the Respondents

Variable	Frequency	Percent
Gender		
Male	798	49.88
Female	802	50.13
Employment Status		
No (not looking)	513	32.08
No (looking)	322	20.14
Yes, part-time	175	10.94
Yes, full-time	589	36.84
Education Qualification		
No Formal Schooling	198	12.14
Informal Schooling Only	82	5.13
Some Primary Schooling	63	3.94
Primary School Completed	210	13.14
Intermediate School	173	10.83
Secondary School Complete	513	32.10
Post-secondary Qualifications	184	11.51
Some University	66	4.13
University Completed	105	6.57
Post-graduate	8	0.50

Source: *Authors' Computation Using Nigeria Afro Barometer (2023)*

The educational distribution shows that a significant proportion of respondents possess at least some level of formal education, but higher education remains limited. About 12% of respondents have no formal schooling, and 5% have only informal education, while roughly 13% completed primary school. The largest group, 55%, completed at least secondary education, which less than 10% of the total population completed university education. This pattern indicates that while basic literacy levels are moderate, advanced education remains relatively low. Educational attainment plays a pivotal role in enhancing welfare and food security. Individuals with higher education levels are more likely to secure stable employment, access better income opportunities, and adopt improved nutrition and resource management practices (Leroy et al., 2015; Jones, 2017). Conversely, low

educational attainment limits economic mobility and perpetuates intergenerational poverty, particularly in rural and agrarian households where literacy rates are often lowest (Akinbode & Adeola, 2017).

Overall, the socioeconomic distribution suggests that food insecurity in Nigeria is likely intertwined with employment and education constraints. The prevalence of limited education and high unemployment among respondents highlights systemic vulnerabilities that can undermine welfare, especially during economic shocks or food price increases. These findings underscore the importance of considering socioeconomic variables in analyzing the relationship between food security and welfare, as they mediate households' capacity to acquire sufficient food and maintain satisfactory living conditions.

4.3 Spatial Distribution of the Respondents

Table 3 presents the spatial distribution of respondents across the urban–rural divide and Nigeria's six geopolitical zones. Understanding the spatial composition of the sample is crucial because both food security and welfare outcomes in Nigeria are profoundly shaped by geographic factors such as agro–ecological conditions, infrastructure, and economic opportunities. The results show that 56.5% of respondents reside in rural settlements, while 43.5% live in urban centers. This rural predominance reflects Nigeria's demographic reality, where a majority of the population still resides in non-urban settings and depends mainly on agriculture and informal sector activities for livelihood. However, this spatial pattern has important implications for the study: rural households tend to face greater exposure to food insecurity and welfare deprivation, owing to limited access to markets, poor infrastructure, and inadequate social services (Headey & Ecker, 2013; Smith & Haddad, 2015).

Table 3. Spatial Distribution of the Respondents

Variable	Frequency	Percent
Primary Sampling Unit		
Urban	696	43.50
Rural	904	56.50
Geopolitical Zone		
North Central	232	14.50
North East	200	12.50
North West	392	24.50
South East	184	11.50
South South	248	15.50
South West	344	21.50

Source: *Authors' Computation Using Nigeria Afro Barometer (2023)*

This is more interesting, as empirical evidence has shown that rural areas in sub-Saharan Africa are disproportionately affected by poverty and food insecurity despite being the primary centers of agricultural production (Beegle et al., 2016; Leroy et al., 2015). This apparent paradox, often described as the "rural hunger trap," arises because smallholder farmers typically experience low productivity,

volatile incomes, and seasonal food shortages. In the Nigerian context, these challenges are compounded by inadequate storage facilities, climate variability, and insecurity that disrupt food supply chains (FAO, 2023; Akinbode & Adeola, 2017). Hence, the larger share of rural respondents in the sample provides an opportunity to capture these critical spatial dynamics in the empirical analysis.

The geopolitical distribution reveals that all six zones are represented, ensuring national coverage. The North West and South West zones account for the most significant shares, approximately 46% of the total sampled population; the South South and North Central geopolitical zones account for 30% of the respondents. The North East and South East combine have the smallest representation of 24%. This distribution broadly aligns with Nigeria's population structure and enhances the representativeness of the Afrobarometer sample. Spatially, these zones differ significantly in socioeconomic development, agricultural potential, and vulnerability to shocks. The northern zones (North East, North West, and North Central) are generally more prone to food insecurity and welfare deprivation, partly due to lower educational attainment, higher poverty incidence, and persistent security challenges (Ogwumike et al., 2020; Durojaiye, 2021). The North East, in particular, has faced long-term conflict and displacement crises that disrupt agricultural activities and reduce food access (FAO, 2023). By contrast, the southern zones (South West, South South, and South East), though more urbanized and economically diversified, still experience welfare disparities driven by income inequality, inflation, and fluctuating food prices (Martin et al., 2016; Napier & Napier, 2021).

The spatial distribution thus provides important context for interpreting the regression results. The predominance of rural respondents and the representation of all geopolitical zones make it possible to assess how location mediates the food security–welfare relationship. It is expected that the marginal effect of food insecurity on welfare will be more substantial in rural and northern zones, given the structural and institutional disadvantages these areas face.

4.4 Respondents' Perceived Quality of Life and Related Experiences

Table 4 provides a summary of respondents' subjective assessments of their living conditions, food security experiences, access to cash income, and perceptions of government performance in managing the economy. These self-reported indicators are crucial in welfare analysis because they capture individual and household experiences that go beyond objective income measures. In developing economies such as Nigeria, subjective indicators of welfare are often more sensitive to changes in food availability, prices, and economic management (Deaton, 2010; Ravallion, 2016). The data reveal that 72% of respondents significantly described their present living conditions as *"bad,"* while only 17% reported at least *"fairly good"* conditions. This distribution shows that a majority of respondents perceive both their welfare status and overall quality of life as unsatisfactory. The dominance of negative evaluations reflects widespread economic hardships, persistent

inflationary pressures, and food price volatility in Nigeria's post-COVID and post-subsidy-removal context (World Bank, 2024; FAO, 2023).

Table 4. Respondents' Perceived Quality of Life and Related Experiences

Variable	Frequency	Percent
Your Present Living Conditions		
Very bad	917	45.13
Fairly bad	432	27.12
Neither good nor bad	168	10.55
Fairly good	223	14.00
Very good	51	3.20
How Often Gone without Food		
Never	260	16.25
Just once or twice	329	20.56
Several times	527	32.94
Many times	358	22.38
Always	126	7.88
How Often Gone without Cash Income		
Never	63	3.94
Just once or twice	187	11.69
Several times	504	31.52
Many times	447	27.95
Always	398	24.89
How the Government is Handling and Managing the Economy		
Very badly	1009	63.18
Fairly badly	388	24.30
Fairly well	183	11.46
Very well	17	1.06

Source: *Authors' Computation Using Nigeria Afro Barometer (2023)*

More disturbing is that subjective welfare perceptions have been shown to correlate strongly with food insecurity and economic vulnerability (Kingdon & Knight, 2006; Easterlin, 2010). When households frequently experience food shortages or income instability, their self-assessment of living standards tends to decline. Thus, the large share of respondents reporting poor living conditions suggests that many households are experiencing multidimensional deprivation, extending beyond income scarcity to include nutrition and livelihood insecurity.

Food security, measured by the frequency of going without food, shows significant deprivation. Going through the table reveals that only 16% of respondents reported *never* going without food, while 21% had this experience *once or twice*. A disturbing 63% of respondents reported going without enough food at least several times, indicating a high prevalence of recurrent food deprivation.

This pattern underscores a high incidence of food insecurity among Nigerian households, consistent with a recent report by the Food and Agriculture Organization (FAO, 2023), which ranked Nigeria among the top countries facing acute food insecurity in Africa. Structural factors such as high unemployment, rural poverty, conflict in agricultural regions, and currency devaluation have constrained food access and affordability (Akinbode & Adeola, 2017; Ogundari, 2017). These

findings align with studies showing that frequent food deprivation negatively affects both objective and subjective welfare outcomes (Headey & Ecker, 2013; Beegle et al., 2016).

The frequency of going without cash income provides additional insight into the financial vulnerability of the sampled respondents. Only 4% of respondents reported *never* lacking cash income, while 32% and 28% experienced this *several times* and *many times*, respectively. Another 25% said they *always* went without a cash income. This indicates that over 84% of respondents faced periodic or chronic liquidity constraints, reflecting widespread income insecurity. Cash income deprivation restricts households' ability to purchase food, access healthcare services, or invest in welfare-enhancing activities (Jolliffe et al., 2022). It also exacerbates food insecurity, as limited financial resources reduce purchasing power even when food is available. The interconnection between income and food security reinforces the multidimensional nature of welfare challenges in Nigeria.

Respondents' self-evaluations of government economic management were overwhelmingly negative, with 87% rating the government's performance as "bad,". Only 13% rated it as "well," which signals how poorly the government is managing the economy based on the subjective Lens of the citizens. This high level of dissatisfaction reflects widespread discontent with macroeconomic policies, high living costs, and declining real incomes (World Bank, 2024). Public perceptions of poor economic governance can also influence subjective welfare by shaping citizens' optimism, trust in institutions, and perceived economic security (Di Tella et al., 2003; Graham, 2011).

Generally, the data reveal a population experiencing multidimensional deprivation, characterized by widespread food insecurity, chronic income shortages, and low satisfaction with living conditions and government performance. These conditions are mutually reinforcing; food insecurity and income deprivation reduce welfare, while perceived poor governance diminishes confidence and social wellbeing. From a policy perspective, these findings highlight the urgency of strengthening food security interventions, stabilizing household incomes, and improving macroeconomic management to enhance welfare. Integrating social protection schemes, such as conditional cash transfers and food subsidy programs, could help mitigate short-term deprivation while improving long-term welfare outcomes.

4.5 Empirical Findings

The Wald test of parallel lines indicates that the generalized ordered logistic model appropriately accounts for the ordinal nature of the welfare outcome. While the overall model does not violate the proportional odds assumption (Chi^2 (24) = 31.60, p = 0.1371), certain covariates including lack of cash income, household size, secondary education, and specific geopolitical zones were identified as violating parallelism. These variables were modelled with varying coefficients across welfare thresholds, justifying the use of the gologit2 partial proportional odds specification.

Table 5 presents the estimated effects of food security and control variables on household welfare in Nigeria. The model is statistically significant (LR χ^2 (32) = 478.04, $p < 0.001$) and explains approximately 14% of the variation in reported welfare (Pseudo $R^2 = 0.1404$), which is consistent with expectations for cross-sectional survey data on subjective outcomes (Beegle et al., 2016; Headey & Ecker, 2013).

As anticipated, food security has a robust and negative association with lower welfare outcomes across all thresholds. Specifically, households experiencing higher frequency of going without food are significantly more likely to report "very bad" or "fairly bad" living conditions. This finding aligns with global evidence linking food insecurity to diminished subjective and material welfare (Frongillo et al., 2017; Raufhon Salahodjaev & Mirziyoyeva, 2021), as well as regional studies in sub-Saharan Africa documenting similar adverse effects on life satisfaction, mental health, and living standards (Pengpid & Peltzer, 2024; Jebena et al., 2017). The magnitude of the coefficient underscores the substantive impact of food deprivation on household's perceived quality of life in Nigeria.

Table 5. Generalized Ordered Logistic Result of the Effects of Food Security on Household Welfare in Nigeria (Very Good is the Baseline Outcome Variable

Independent Variables	Thresholds of the Outcome Variable			
	Very Bad	Fairly Bad	Neither Good nor Bad	Fairly Good
Food Security	-0.374***	-0.374***	-0.374***	-0.374***
	(0.055)	(0.055)	(0.055)	(0.055)
Income Inequality	-0.316***	-0.195**	-0.087	0.219
	(0.073)	(0.075)	(0.084)	(0.181)
Managing Economy	0.402***	0.402***	0.402***	0.402***
	(0.080)	(0.080)	(0.080)	(0.080)
Deprivation	-0.081	-0.081	-0.081	-0.081
	(0.142)	(0.142)	(0.142)	(0.142)
Age	-0.009*	-0.009*	-0.009*	-0.009*
	(0.004)	(0.004)	(0.004)	(0.004)
Household Size	0.066*	0.044	-0.088*	-0.207*
	(0.033)	(0.032)	(0.039)	(0.102)
Employed	-0.274**	-0.274**	-0.274**	-0.274**
	(0.116)	(0.116)	(0.116)	(0.116)
Secondary Education	0.305*	0.297*	0.031	-0.193
	(0.147)	(0.152)	(0.166)	(0.349)
Rural	-0.031	-0.031	-0.031	-0.031
	(0.150)	(0.150)	(0.150)	(0.150)
North East	0.169	0.169	0.169	0.169
	(0.195)	(0.195)	(0.195)	(0.195)
North West	1.050***	0.435*	-0.377*	0.777*
	(0.216)	(0.196)	(0.211)	(0.404)
South East	-0.657**	-0.408	-1.588***	-0.197
	(0.257)	(0.315)	(0.453)	(0.676)
South South	-0.793***	-0.359	-0.784**	-0.509
	(0.226)	(0.265)	(0.303)	(0.776)

South West	-0.314	-0.314	-0.314	-0.314
	(0.209)	(0.209)	(0.209)	(0.209)
Constant	1.443***	-0.248	-0.169	-3.039***
	(0.388)	(0.387)	(0.403)	(0.777)
Observations	1,245	1,245	1,245	1,245
LR chi2(32) = 478.04, Prob > chi2 = 0.0000				
Log likelihood = -1462.9483, Pseudo R2 = 0.1404				
Note: Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1 refer to statistical significance at 99%, 95%, and 90% confidence intervals.				

Source: *Authors' Computation Using Nigeria Afro Barometer (2023)*

Other covariates exhibit patterns consistent with prior literature. Employment status is positively associated with higher welfare, reflecting the critical role of stable income in mitigating deprivation (Beegle et al., 2016; Leroy et al., 2015). Age has a small but statistically significant negative association with lower welfare categories, suggesting younger household heads experience slightly higher welfare, potentially due to higher labor participation and adaptive coping strategies. Household size shows mixed effects: larger households are associated with lower welfare at higher thresholds, reflecting dependency pressures, but may offer labor support at lower thresholds, consistent with the dual role of extended households documented in Nigeria and SSA contexts (Smith & Haddad, 2015; Akinbode & Adeola, 2017).

Educational attainment and geographic location also influence welfare. Secondary education is associated with higher welfare in lower categories, supporting evidence that education enhances access to resources, employment opportunities, and food security (Jones, 2017; Headey & Ecker, 2013). Regional effects reveal substantial heterogeneity as respondents in northern zones, particularly the North West, report higher odds of lower welfare, while southern zones such as South East and South South exhibit protective effects in some thresholds. These patterns reflect structural disparities in poverty, agricultural productivity, conflict exposure, and access to services across Nigeria's geopolitical zones (Ogwumike et al., 2020; FAO, 2023).

Households perceiving higher income inequality are more likely to report lower welfare, particularly in the lower categories, highlighting the intersection of food security and broader economic deprivation (Ravallion, 2016). Positive perceptions of government management of the economy are associated with higher welfare, suggesting that confidence in economic governance may buffer some subjective welfare loss, consistent with findings from developing country contexts (Di Tella et al., 2003; Graham, 2011).

Overall, the empirical results confirm that frequent food deprivation significantly reduces household welfare in Nigeria, even after accounting for socioeconomic, demographic, and spatial controls. The findings are consistent with the multidimensional welfare framework, demonstrating that food security is both a direct determinant of well-being and a mediator of broader deprivation outcomes. These results reinforce prior global and regional studies, highlighting the

importance of addressing food insecurity to enhance welfare and quality of life (Frongillo et al., 2017; FAO, 2023; Beegle et al., 2016).

5. Conclusion and Policy Recommendations

This study examined the impact of food security on household welfare in Nigeria using Afrobarometer data and a generalized ordered logistic regression framework. Welfare was proxied by respondent's perceived living conditions, while food security was measured by the frequency of going without food. Results indicate that frequent food insecurity and cash deprivation significantly reduce household welfare, even after controlling for socioeconomic, demographic, and spatial factors. Other factors influencing welfare include educational attainment, employment status, perceptions of government economic management, and regional location. These findings underscore that food security is a core determinant of household well-being, influencing not only nutritional outcomes but also subjective perceptions of quality of life. The results are consistent with global and regional studies linking food insecurity and economic vulnerability to welfare deprivation (Frongillo et al., 2017; Beegle et al., 2016; FAO, 2023).

Based on the empirical evidence, the following policy directions are proposed:

i. Strengthen food security systems: Investments in food production, storage, and distribution infrastructure, particularly in rural and conflict-prone regions, are essential to reduce household food deprivation and its negative welfare consequences.
ii. Expand social protection and income support: Targeted cash transfers, public works programs, and other safety nets can buffer households against income and food shocks, with special attention to vulnerable populations facing chronic deprivation.
iii. Promote education and skills development: Improving access to formal education and vocational training can enhance household resilience, increase employment opportunities, and support welfare improvement.
iv. Enhance macroeconomic management and governance: Transparent fiscal and monetary policies, along with mechanisms to stabilize food prices, can improve citizens' confidence in the economy and indirectly support welfare.
v. Implement region-specific interventions: Address spatial disparities by targeting programs to areas with lower welfare outcomes, such as agricultural support and livelihood diversification in northern zones, and cost-of-living or market access interventions in southern regions.

Collectively, these findings highlight that addressing food insecurity is central to improving household welfare in Nigeria. Policies that integrate food availability, income support, education, and regional development can mitigate deprivation and enhance overall quality of life.

Author Contributions

Conceptualization, all authors; methodology, all authors; validation, all authors; formal analysis, all authors; resources, all authors; writing original draft preparation, all authors; writing review and editing, all authors; all authors have read and agreed to the published version of the manuscript.

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Conflicts of Interest

The authors have no relevant financial or non-financial interests to disclose.

Data Availability Statement

The data that support the findings of the study are publicly available at https://www.afrobarometer.org

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Appendices

Appendix 1. Effects of Food Security on Household Welfare in Nigeria

Independent Variables	Coefficients		
	Overall Estimate	Male Estimate	Female Estimate
Food Security	-0.378***	-0.408***	-0.351***
	(0.054)	(0.000)	(0.000)
Income Inequality	-0.227***	-0.270***	-0.182**
	(0.062)	(0.002)	(0.046)
Managing Economy	0.414***	0.397***	0.416***
	(0.079)	(0.000)	(0.000)
Deprivation	-0.083	0.120	-0.266
	(0.14)	(0.554)	(0.176)
Age	-0.009**	-0.005	-0.013*
	(0.004)	(0.381)	(0.059)
Household Size	0.026	0.007	0.061
	(0.026)	(0.837)	(0.123)
Employed	-0.291**	-0.072	-0.689***
	(0.114)	(0.658)	(0.000)
Secondary Education	0.256**	0.056	0.498**
	(0.126)	(0.760)	(0.007)
Rural	0.015	0.137	-0.094
	(0.147)	(0.517)	(0.652)
North East	0.194	0.255	0.222
	(0.197)	(0.380)	(0.420)
North West	0.481***	0.655**	0.242
	(0.176)	(0.012)	(0.323)
South East	-0.782***	-0.944**	-0.953*
	(0.247)	(0.013)	(0.074)
South South	-0.855***	-0.541*	-1.124***
	(0.219)	(0.081)	(0.000)
South West	-0.339	-0.136	-0.541*
	(0.209)	(0.649)	(0.071)
/cut1	-1.441***	-1.261	-1.611
	(0.358)	(2.312)	(2.596)
/cut2	0.146	0.303	0.041
	(0.357)	(0.747)	(0.937)
/cut3	0.862**	1.107	0.686
	(0.358)	(0.053)	(0.295)
/cut4	2.899***	3.349	2.593
	(0.385)	(2.202)	(1.553)
Observations	1245	618	627
Pseudo R^2	0.104	0.113	0.108

Note: Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1 refer to statistical significance at 99%, 95%, and 90% confidence intervals.

Source: *Authors' Computation Using Nigeria Afro Barometer (2023)*

Appendix 2. Brant Test of Parallel Regression Assumption

	chi2	p>chi2	df
All	135.33	0.000	42
Food Security	3.29	0.349	3
Income Inequality	10.80	0.013	3
Managing Economy	6.01	0.111	3
Deprivation	0.25	0.970	3
Age	1.76	0.624	3
Household Size	11.34	0.010	3
Employed	2.05	0.563	3
Secondary Education	2.11	0.550	3
Rural	1.29	0.732	3
North East	1.99	0.575	3
North West	47.97	0.000	3
South East	12.67	0.005	3
South South	6.20	0.102	3
South West	1.93	0.588	3

Source: *Authors' Computation Using Nigeria Afro Barometer (2023)*