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# Assessment of Food Insecurity, Household Resource Allocation and Coping Strategies among Rural Farming Households in Southwestern Nigeria

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**Abstract**
This study assessed food insecurity, household resource allocation and coping strategies among rural farming households in Ogun, Oyo and Ekiti States. A descriptive survey design was adopted. A multi-stage sampling procedure was used to select 600 respondents from 11,990 registered rural farming household. Data were collected with a validated questionnaire (Cronbach's alpha = 0.91) and analysed using descriptive statistics, principal component analysis (PCA), the Coping Strategy Index (CSI), the Food Insecurity Experience Scale (FIES), Pearson's correlation, analysis of variance (ANOVA) and ordered logit regression. Radio (94.5%), friends and neighbours (92.5%) and cell phones (91.5%) were the leading sources of nutritional information. Only 8.0% of households were food secure, while 28.7%, 14.8% and 48.5% were mildly, moderately and severely food insecure respectively. Most households used low (77.0%) rather than medium (18.7%) or high (4.3%) coping strategies. Household resource allocation was strongly related to food insecurity ($r = 0.868$, $p < 0.05$), and food insecurity differed significantly across the states ($F = 5.99$, $p < 0.05$), with Oyo State recording the highest incidence of severe food insecurity (56.0%). In the pooled ordered logit model, age, monthly income, cooperative membership, resource allocation and the coping strategy index were associated with better food-security outcomes, whereas education and farming experience were positively associated with food insecurity. Educational and extension programmes that build farmers' resource-management skills, together with stronger cooperatives and safety nets, are recommended.

**Keywords:** Food insecurity, resource allocation, coping strategies, farming households.

## 1. Introduction

The second Sustainable Development Goal (SDG 2) seeks to end hunger and achieve food security by 2030. The Food and Agriculture Organization (FAO, 2021) defines food security as a situation in which all people, at all times, have access to sufficient, safe and nutritious food to meet their dietary needs for an active and healthy life. Nigeria, the most populous country in Africa, continues to face serious challenges in both the availability of and access to food. Food insecurity, characterised by irregular access to enough safe and nutritious food, undermines nutrition, health and well-being by reducing dietary quality and disrupting eating patterns (Fadare *et al*., 2019). Its drivers include drought, land degradation, rapid population growth, a lack of productive resources and assets, poverty and hardship (Farzana *et al*., 2017), and it has remained a major public health concern in developing countries (Endale *et al*., 2014).

Rural farming households occupy a paradoxical position in this debate. They are the backbone of food production in developing countries, yet they are often among the most food insecure because of limited resources, weak access to credit, inadequate storage and processing facilities and rising input costs. Odusina *et al*. (2017) reported that the likelihood of food security among rural households declines sharply after a climate-related shock or an illness in the family, while access to credit and non-farm income improves it. Understanding how such households mobilise and use what they have is therefore central to explaining why some remain food secure and others do not.

Household resource allocation is the process through which a household distributes its income, labour, time, materials, social amenities and other assets among competing uses. A farming household that allocates its resources efficiently can raise its income and thereby improve its financial access to food. When resources fall short, households adopt coping strategies, that is, short-term behavioural responses such as switching to cheaper or less preferred foods, borrowing food, rationing portions, sending children to eat with neighbours or skipping meals (Maxwell, 1996; Gupta *et al*., 2015; Farzana *et al*., 2017). The kind and severity of the coping strategies used are widely regarded as a behavioural signal of the depth of food insecurity.

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A large body of Nigerian research has examined food insecurity using anthropometric measures, calorie intake or dietary diversity scores (Akerele, 2015; Eyinla, 2021), and a smaller number of studies have looked at food access and coping strategies separately (Odusina *et al*., 2015; Babatunde *et al*., 2007). Studies that treat food insecurity, household resource allocation and coping strategies together among rural farming households in Southwestern Nigeria are, however, scarce. This gap matters because resource allocation is a decision variable that households and policy makers can influence, and coping strategies show what households do when that allocation is insufficient. This paper therefore assesses food insecurity, household resource allocation and coping strategies among rural farming households in Ogun, Oyo and Ekiti States and identifies the socio-economic factors that shape food-security status in the region.

The study is guided by a simple conceptual logic. Households allocate income, labour, time, materials and social amenities to production, consumption and other uses, and this allocation shapes their availability of and access to food. Where access is inadequate, households adjust their behaviour through coping strategies, and the frequency and severity of these strategies signal how deep the food insecurity is. Socio-economic characteristics such as age, education, household size, income, extension contact and cooperative membership, together with the sources of nutritional information available to the household, condition each of these links. The paper is organised accordingly: it states the objectives, describes the methodology, presents and discusses the results, and closes with conclusions and recommendations.

### 1.1 Objectives of the Study

The broad objective of the study was to assess food insecurity, household resource allocation and coping strategies among rural farming households in Southwestern Nigeria. The specific objectives were to:

1. Identify the sources of nutritional information among rural farming households in the study area;
2. Determine the relationship between household resource allocation and food insecurity status of the households;
3. Examine the incidence of food insecurity among the households;
4. Determine the factors responsible for food insecurity among the households; and
5. Examine the influence of coping strategies on the incidence of food insecurity across the study area.

Three null hypotheses were tested at the 5% level of significance. H01: there is no significant relationship between household resource allocation and food insecurity. H02: there is no significant relationship between coping strategies and food insecurity. H03: there is no significant difference in the food insecurity status of rural farming households across the states.

## 2. Methodology

The study was conducted in the Southwest geopolitical zone of Nigeria, which comprises Ekiti, Lagos, Ogun, Ondo, Osun and Oyo States. The zone covers about 114,271 km², roughly 12% of Nigeria's land area, and lies between latitudes 5° N and 9° N. Its population was estimated by the National Population Commission (2016) at 21,974,678. The zone has four sub-ecological belts, namely swamp, mangrove forest, moist and dry lowland forest, and derived savannah. Lagos, Ondo and Ogun lie mainly in the tropical rainforest with swamp forest along the coast, whereas parts of Osun, Oyo and Ekiti fall within the derived savannah (Adeoye and Ademolu, 2022). The equatorial climate produces distinct rainy and dry seasons; the rainy season can last up to nine months with peaks in July and September, and annual rainfall in the coastal areas of Lagos and Ogun ranges from about 2,600 to 2,900 mm. Agriculture is the main economic activity. Arable cropping of yam, cassava, maize and rice is common, and tree crops such as cocoa, oil palm, cashew and kolanut are widely grown (Timmer, 2015). The study was carried out in Ogun, Oyo and Ekiti States.

A descriptive survey research design was adopted. The design suits the study because it allows data on the socio-economic characteristics, resource allocation patterns, food-security experiences and coping behaviour of a large group of households to be collected at one point in time and analysed quantitatively. The population comprised all rural farming households in Southwestern Nigeria. The sampling frame was the register of rural farming households kept by the Agricultural Development Programme (ADP) in each selected state. In the three selected states, 11,990 registered rural farming households were on record.

A multi-stage sampling technique was used. In the first stage, three of the six Southwestern states (50%), namely Ogun, Oyo and Ekiti, were purposively selected because of their high concentration of rural farming households and, in the case of Oyo, because it is the largest State in the zone and all kinds of rural households were available in this State and can be generalized for the other Southwestern States. In the second stage, the ADP sampling frame was used to list the extension blocks in each state, and 10% of the 69 blocks (seven blocks) were randomly selected. In the third stage, 10% of the 488 extension cells in the sampled blocks (49 cells) were randomly selected. In the final stage, 5% of the 11,990 registered rural farming households in the selected cells were randomly drawn, giving a sample of 600 respondents (Table 1). The sample size satisfies the 10% rule commonly used to justify the representativeness of survey samples.

Table 1: Sampling procedure and sample size

| State | Extension blocks | Blocks sampled (10%) | Extension cells | Cells sampled (10%) | Registered households | Households sampled (5%) |
|---|---|---|---|---|---|---|
| Ogun | 20 | 2 | 130 | 13 | 2,997 | 150 |
| Oyo | 33 | 3 | 230 | 23 | 5,993 | 300 |
| Ekiti | 16 | 2 | 128 | 13 | 3,000 | 150 |
| Total | 69 | 7 | 488 | 49 | 11,990 | 600 |

*Source: ADP headquarters of the selected states, 2026.*

Table 2: Socio-economic characteristics of the respondents (n = 600)

| Variable | Ogun (n = 150) % | Oyo (n = 300) % | Ekiti (n = 150) % | Pooled (n = 600) % |
|---|---|---|---|---|
| **Age (years)** | | | | |
| ≤ 40 | 43.3 | 66.0 | 23.3 | 49.7 |
| 41–50 | 50.0 | 28.0 | 56.0 | 40.5 |
| 51–60 | 6.7 | 6.0 | 20.7 | 9.8 |
| Mean (SD) | 42 (7.30) | 40 (7.72) | 46 (6.39) | 42 (7.68) |
| Sex: male | 60.0 | 54.0 | 74.0 | 60.5 |
| Marital status: married | 71.3 | 56.0 | 68.7 | 63.0 |
| **Highest education** | | | | |
| Non-formal / primary | 21.3 | 8.0 | 5.3 | 10.7 |
| Secondary | 50.0 | 52.0 | 70.0 | 56.0 |
| Tertiary | 28.7 | 40.0 | 24.7 | 33.3 |
| **Household size (persons)** | | | | |
| 1–4 | 43.3 | 54.0 | 18.7 | 42.5 |
| 5–8 | 50.0 | 34.0 | 77.3 | 48.8 |
| 9–12 | 6.7 | 12.0 | 4.0 | 8.7 |
| Mean (SD) | 5 (2.60) | 5 (2.56) | 5 (2.57) | 5 (2.60) |
| **Farming experience (years)** | | | | |
| 1–10 | 28.0 | 42.0 | 12.7 | 31.2 |
| 11–20 | 67.3 | 52.0 | 83.3 | 63.7 |
| 21–30 | 4.7 | 6.0 | 4.0 | 5.2 |
| Mean (SD) | 12 (4.27) | 12 (5.24) | 15 (3.29) | 13 (4.69) |
| **Monthly income (₦)** | | | | |
| ≤ 60,000 | 51.3 | 76.0 | 24.7 | 57.0 |
| 60,001–80,000 | 44.0 | 20.0 | 71.3 | 38.8 |
| > 80,000 | 4.7 | 4.0 | 4.0 | 4.2 |
| Mean (SD) | 64,727 (9,930) | 58,910 (12,459) | 69,330 (9,981) | 62,969 (12,081) |
| **Extension contact** | | | | |
| Regular | 9.3 | 12.0 | 0.0 | 8.3 |
| Occasional | 72.7 | 54.0 | 72.7 | 63.3 |
| Never | 18.0 | 34.0 | 27.3 | 28.3 |
| Cooperative member | 77.3 | 66.0 | 100.0 | 77.3 |

*Source: Field survey, 2026. Percentages for the pooled sample were recomputed from the state frequencies.*

Data were collected with a structured, interviewer-administered questionnaire divided into five sections: sources of nutritional information, household resource allocation, incidence of food insecurity, options for household food security and coping strategies. Face and content validity were established through review by project supervisors in the Department of Agricultural Economics and Extension of the host university and by food and nutrition assessors in the Department of Human Nutrition and Dietetics, University of Ibadan.

Reliability was tested by administering the questionnaire to respondents outside the sampled households. The Cronbach's alpha coefficient of 0.91 showed that the instrument was reliable.

Food insecurity was the dependent variable and was measured with the eight-item Food Insecurity Experience Scale (FIES) survey module, which captures self-reported experiences such as worry about not having enough to eat, eating a limited variety of foods, skipping meals, running out of food and going a whole day without eating. Responses were scored on a five-point scale, and households were classified as food secure or as mildly, moderately or severely food insecure. *Coping strategies* were measured with the Coping Strategy Index (CSI) of Maxwell (1996). Respondents reported how often, in the previous seven days, they had relied on strategies such as depending on less preferred foods, borrowing food, limiting portion sizes, reducing the number of meals or sending children to eat with neighbours. The frequency of each strategy was multiplied by its severity weight and the products were summed. Total scores of 0 to 50 were classed as low, 51 to 100 as medium and above 100 as high coping strategy.

Household resource allocation was measured on 19 items covering income, social, material, human and time resources, each scored 2 (usually allocated), 1 (seldom allocated) or 0 (not allocated). Principal component analysis with varimax rotation was used to summarise the allocation pattern, and components with eigenvalues below one were dropped following the Kaiser criterion (Kaiser, 1960). Socio-economic characteristics and sources of nutritional information were summarised with frequencies, percentages, means and standard deviations. Pearson's product moment correlation was used to test H01 and H02, and one-way ANOVA was used to test H03. The determinants of food-insecurity status were estimated with an ordered logit model, expressed as:

$$ln[P(Y \leq j) / P(Y > j)] = \alpha_j - (\beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_n X_n)$$

where Y is the household's food-insecurity category, α (with subscript j) denotes the cut-points between categories and X1 to Xn are the explanatory variables: age, sex, marital status, level of education, household size, farming experience, monthly income, extension contact, cooperative membership, the household resource allocation score and the coping strategy index. Marginal effects were computed to show the change in the probability of each food-insecurity category associated with a unit change in each explanatory variable.

## 3. Results and Discussions

### 3.1 Socio-economic Characteristics of the Households

Table 2 summarises the socio-economic characteristics of the 600 respondents. The household heads were mostly in their productive years: 90.2% were aged 50 years or younger, and the mean age was 42 years (SD = 7.68), ranging from 40 years in Oyo to 46 years in Ekiti. Men headed 60.5% of the households, and 63.0% of the respondents were married. The typical respondent had secondary education (56.0%) and about one-third (33.3%) had tertiary education, so only a small minority had no formal schooling. The average household had five members (SD = 2.60), and the mean farming experience was 13 years (SD = 4.69), with 63.7% of the respondents having between 11 and 20 years of experience.

These characteristics have implications for food security. Young adults are physically capable of labour-intensive farming and is likely to be receptive to new practices, provided that inputs, training and credit are available. The fairly large households provide family labour, which lowers the need for hired labour, but they also raise the number of mouths to feed, so that food security depends on how well production and income are managed. The mean monthly income of about ₦62,969, with 55.8% of the households earning between ₦40,001 and ₦60,000, indicates a modest financial cushion that leaves little room for absorbing shocks. Extension contact was thin: only 8.3% of the respondents had regular visits, 63.3% were visited occasionally and 28.3% never, which limits the diffusion of improved practices (Cameron and Lim, 2022). By contrast, 77.3% belonged to a cooperative, a platform through which households can pool resources, buy inputs collectively and access credit (Wossen *et al*., 2017). The pattern that experienced farmers make better decisions about crop choice and resource use agrees with the finding of Babatunde *et al*. (2007) that age, education and farming experience are important determinants of the food-security status of farming households.

### 3.2 Sources of Nutritional Information

Table 3 shows that nutritional information reached the households mainly through radio (94.5%), friends and neighbours (92.5%), cell phones (91.5%) and health workers (89.0%). Television was used by 57.7% of the respondents, while the internet or e-mail (13.2%) and newspapers (6.3%) played minor roles. The dominance of radio, mobile phones and interpersonal networks reflects the lower cost and wider reach of these channels in rural communities and points to a high digital and literacy level that limits the use of print and online media due to low connectivity and poor network. It also means that nutrition-education messages on dietary diversity, food preparation and storage can be delivered cheaply through radio programmes, mobile platforms and health workers. The result agrees with Chung *et al*. (2020), who found that rural residents obtain nutritional knowledge mainly from radio and health facilities.

### 3.3 Household Resource Allocation

Principal component analysis was used to describe how the households allocate resources. The 19 resource items fell into five groups: income (wages from farm work, income from landed property, income from other activities and dividends or credit), social (road, electricity, health care, pipe-borne water and toilet), material (farm inputs, improved seeds, fertiliser, agrochemicals, cutlasses and hoes, wire fence and farm security), human (labour) and time resources (time

Table 3: Sources of nutritional information among the households (n = 600)

| Source | Ogun % | Oyo % | Ekiti % | Pooled % |
|---|---|---|---|---|
| Radio | 95.3 | 94.0 | 94.7 | 94.5 |
| Friends / neighbours | 74.0 | 100.0 | 96.0 | 92.5 |
| Cell phone | 70.0 | 100.0 | 96.0 | 91.5 |
| Health officer / worker | 69.3 | 96.0 | 94.7 | 89.0 |
| Television | 62.7 | 52.0 | 64.0 | 57.7 |
| Internet / e-mail | 36.7 | 4.0 | 8.0 | 13.2 |
| Newspaper | 18.7 | 0.0 | 6.7 | 6.3 |

*Source: Field survey, 2026. Multiple responses were allowed.*

Table 4: Principal component analysis of household resource allocation: retained components and leading loadings

| Resource group (leading variable) | Ogun | Oyo | Ekiti | Pooled |
|---|---|---|---|---|
| Components retained (variance explained) | 7 (77.63%) | 6 (77.63%) | 4 (78.90%) | 4 (64.87%) |
| Income: wages from farm work | 0.927 | 0.924 | 0.826 | 0.964 |
| Social: leading amenity | Electricity 0.824 | Pipe water 0.770 | Pipe water 0.959 | Road 0.851 |
| Material: leading input | Cutlass/hoe 0.867 | Improved seed 0.836 | Improved seed 0.924 | Improved seed 0.816 |
| Human: number of labourers | 0.895 | 0.864 | 0.735 | 0.763 |
| Time: daily time on farm work | 0.715 | 0.893 | 0.879 | 0.865 |

*Source: Field survey, 2026. Varimax-rotated factor loadings.*

Table 5: Food insecurity status of the households (n = 600)

| Status | Ogun n (%) | Oyo n (%) | Ekiti n (%) | Pooled n (%) |
|---|---|---|---|---|
| Food secure | 12 (8.0) | 18 (6.0) | 18 (12.0) | 48 (8.0) |
| Mildly food insecure | 29 (19.3) | 90 (30.0) | 53 (35.3) | 172 (28.7) |
| Moderately food insecure | 28 (18.7) | 24 (8.0) | 37 (24.7) | 89 (14.8) |
| Severely food insecure | 81 (54.0) | 168 (56.0) | 42 (28.0) | 291 (48.5) |

*Source: Field survey, 2026.*

spent on farm work and on household chores). Using the Kaiser criterion, seven components were retained in Ogun State, six in Oyo State, four in Ekiti State and four for the pooled sample, explaining 77.63%, 77.63%, 78.90% and 64.87% of the total variance respectively (Table 4).

In the pooled analysis, wages from farm work (0.964) and income from other activities (0.932) had the highest loadings among income resources, followed by dividends or credit received (0.677) and income from landed property (0.550). This shows that both farm-based and diversified income sources shape a household's capacity to acquire food and inputs. Among social resources, road (0.851), electricity (0.825), pipe-borne water (0.816), health care (0.813) and toilet facilities (0.811) loaded strongly, which highlights the role of rural infrastructure in market access, food preservation, hygiene and health. Improved seeds (0.816), fertiliser (0.785), agrochemicals (0.771) and farm inputs (0.741) dominated the material resources, while the number of labourers (0.763) and the time devoted to farm work (0.865) were the main human and time resources. Time spent on household chores (0.635) had a lower loading, which reflects the trade-off between farm work and domestic duties, especially for women.

Some state-level differences are worth noting. In Ogun State, wire fencing (−0.748) and farm security (−0.590) loaded negatively on the material factor, and toilet facilities (−0.454) did so in Oyo State, suggesting that crop protection and sanitation are not traded off in the households rather than complementary claims on household resources in those states. In Ekiti State the social-amenity items all loaded above 0.93 on a single dominant component that explained 53.35% of the variance, which suggests that access to infrastructure is the main axis along which households differ. These findings are consistent with Eyinla (2021), who observed that household resources such as water, electricity and sanitation improve the ability to store food and to maintain hygiene, and with the view that access to fertiliser, improved seeds and agrochemicals is essential to agricultural output.

Table: Coping strategy index of the households (n = 600)

| Coping level (CSI score) | Ogun n (%) | Oyo n (%) | Ekiti n (%) | Pooled n (%) |
|---|---|---|---|---|
| Low (0–50) | 122 (81.3) | 223 (74.3) | 117 (78.0) | 462 (77.0) |
| Medium (51–100) | 26 (17.3) | 58 (19.3) | 28 (18.7) | 112 (18.7) |
| High (> 100) | 2 (1.3) | 19 (6.3) | 5 (3.3) | 26 (4.3) |

*Source: Field survey, 2026.*

Table 7: Results of hypothesis testing

| Hypothesis | Test | Statistic | p-value | Decision |
|---|---|---|---|---|
| H01: Resource allocation and food insecurity | Pearson correlation | r = 0.868 | < 0.001 | Reject H01 |
| H02: Coping strategies and food insecurity | Pearson correlation | r = 0.025 | < 0.05* | Accept H02 |
| H03: Food insecurity across states | One-way ANOVA | F(2, 597) = 5.99 | 0.003 | Reject H03 |

*Source: Field survey, 2026.* *p < 0.05

**3. 4 Incidence of Food Insecurity**

Food insecurity was pervasive. Only 8.0% of the households were food secure, and 48.5% were severely food insecure, 14.8% moderately and 28.7% mildly food insecure (Table 5). Severe food insecurity was most common in Oyo State (56.0%) and Ogun State (54.0%), while Ekiti State had the largest share of food-secure households (12.0%) and the lowest share of severely food insecure ones (28.0%). In other words, more than nine in ten rural farming households in the sampled states experienced some degree of food insecurity, even though they are engaged in food production. Households in the severe category are exposed to hunger, malnutrition and ill health, and those in the mild and moderate categories are likely to be cutting the quality and variety of their diets, which risks micronutrient deficiencies among children and other vulnerable members. The low share of food-secure households also implies fragile food systems, in which price shocks, poor harvests or illness can push marginal households into severe insecurity. Similar patterns of widespread and acute food insecurity among rural households facing multiple shocks were reported by Endale *et al*. (2014), Fikire and Zegeye (2022) and Hatloy (2020).

**3.5 Coping Strategies and Food Insecurity**

Most households (77.0%) used low-level coping strategies such as depending on cheaper or less preferred foods, 18.7% used medium-level strategies such as limiting portions, borrowing food or reducing the number of meals, and 4.3% resorted to high-level strategies such as skipping meals, selling assets or sending members to beg (Table 6). Oyo State had the largest share of households in the high category (6.3%), which mirrors its high incidence of severe food insecurity. The dominance of low-level coping is not evidence of food security: it suggests that many households are still in the early stages of adjustment and could be stabilised by timely support, whereas the medium and high groups are already showing signs of stress and need targeted assistance to avoid depleting their assets.

A cross-tabulation of the two indicators gives a clearer picture. Among the 291 severely food insecure households, 72.5% used low coping strategies, 22.7% medium and 4.8% high, whereas among the 48 food-secure households the corresponding shares were 83.3%, 12.5% and 4.2%. Medium-level coping was therefore almost twice as frequent among severely food insecure households as among food-secure ones. However, the fact that nearly three-quarters of severely food insecure households were still classed as low copers implies that many of them lack the resources or options that would enable more effective responses. This is in line with Endale *et al*. (2014), who found that households facing shortages mostly reduce meal sizes, borrow food or use savings, and with the argument of Yimer (2020) that coping strategies and food insecurity are closely linked.

**3.6 Test of Hypotheses**

The results in Table 7 led to the rejection of all three null hypotheses. Household resource allocation was strongly and significantly related to food insecurity (r = 0.868), which supports the view that how households distribute income, inputs, labour and time is closely tied to their food-security outcomes; a similar link between household resources and food insecurity has been reported in the literature (Eyinla, 2021). The relationship between coping strategies and food insecurity was statistically significant, although there was no correlation between coping strategies and food insecurity (r = 0.025, p = 0.05), so coping behaviour appears to signal rather than explain the level of food insecurity. The ANOVA showed that food insecurity status differed significantly across Ogun, Oyo and Ekiti States (F = 5.99, p < 0.05), and the distribution in Table 5 indicates that Oyo State had the highest level of severe food insecurity. State-specific programmes are therefore more appropriate than a uniform regional strategy.

**3.7 Determinants of Food Insecurity**

Table 8 presents the ordered logit estimates. The

Table 8: Ordered logit estimates of the determinants of food insecurity

| Variable | Ogun | Oyo | Ekiti | Pooled |
|---|---|---|---|---|
| Age | −0.003 | −0.063*** | 0.113*** | −0.023** |
| Sex | −0.045 | −0.397 | −0.294 | −0.026 |
| Marital status | 0.272 | 0.820*** | −1.105** | 0.358** |
| Level of education | 0.014 | 0.236*** | 0.129** | 0.098*** |
| Household size | −0.071*** | 0.310*** | 0.100 | 0.015 |
| Farming experience | 0.119** | 0.183*** | 0.047 | 0.069*** |
| Monthly income (₦) | $-1.01\times10^{-6}$ | $-1.10\times10^{-4}$*** | $-1.47\times10^{-5}$ | $-3.64\times10^{-5}$*** |
| Extension contact | −0.235 | −0.184 | −2.543*** | 0.223 |
| Cooperative membership | −1.193** | −0.163 | – | −0.519** |
| Resource allocation | −1.422*** | −0.464*** | −12.994*** | −0.868*** |
| Coping strategy index | −0.044*** | −1.218*** | −0.155* | −0.025*** |
| LR $\chi^2$ | 57.17*** | 189.35*** | 102.47*** | 136.59*** |
| Pseudo $R^2$ | 0.1635 | 0.2986 | 0.2580 | 0.0953 |
| Observations | 150 | 300 | 150 | 600 |

*Source: Field survey, 2026. ***, ** and * denote significance at 1%, 5% and 10% respectively.*

Table 9: Pooled marginal effects on the probability of each food-security status

| Variable | Food secure | Moderately insecure | Severely insecure | Mildly insecure |
|---|---|---|---|---|
| Age | 0.002** | 0.002** | 0.001* | −0.005** |
| Marital status | −0.019 | −0.024* | −0.008 | 0.051* |
| Level of education | −0.007*** | −0.009*** | −0.003** | 0.018*** |
| Household size | −0.004 | −0.005 | −0.002 | 0.010* |
| Farming experience | −0.005*** | −0.006*** | −0.002** | 0.012*** |
| Monthly income (₦) | $2.56\times10^{-6}$*** | $3.15\times10^{-6}$*** | $9.96\times10^{-7}$** | $-6.71\times10^{-6}$*** |
| Extension contact | −0.016* | −0.020* | −0.006 | 0.042* |
| Cooperative membership | 0.035** | 0.043** | 0.014* | −0.092** |
| Resource allocation | 0.170*** | 0.209*** | 0.066* | −0.446*** |
| Coping strategy index | 0.002*** | 0.002*** | 0.001** | −0.004*** |

*Source: Field survey, 2026. Sex was not significant and is omitted. ***, ** and * denote significance at 1%, 5% and 10% respectively.*

likelihood-ratio statistics were significant at the 1% level in all four models, showing that the explanatory variables jointly explained differences in food-insecurity status. The pseudo $R^2$ values were 0.163 for Ogun, 0.299 for Oyo, 0.258 for Ekiti and 0.095 for the pooled sample, which is typical of cross-sectional models of complex social outcomes in which many influences are unobserved.

Because ordered logit coefficients show direction only, the pooled marginal effects in Table 9 are used to interpret magnitudes. Their signs on the probability of being food secure are consistent with the signs of the coefficients in Table 8, where a negative coefficient corresponds to a better food-security outcome and a positive coefficient to a worse one.

*Resource allocation.* Resource allocation had a significant negative coefficient in every state and in the pooled model (−0.868, $p < 0.01$). Its marginal effect indicates that a better allocation score raises the probability of being food secure by 17.0 percentage points. Households that combine income, social, material, human and time resources effectively are better able to produce and buy food, which agrees with the strong correlation reported above and with the argument that improved resource use raises income and food access.

*Income and cooperative membership.* Monthly income was significant in the pooled model and in Oyo State, and each additional ₦10,000 raised the probability of being food secure by about 2.6 percentage points. Cooperative membership was also significant, both in Ogun State (−1.193) and in the pooled sample (−0.519), and it raised the probability of food security by 3.5 percentage points while reducing the probability of mild food insecurity by 9.2 percentage points. Cooperatives widen access to credit, inputs and markets and provide a channel for sharing information, and they should be regarded as an entry point for food-security programmes.

*Age and coping strategies.* Older household heads were slightly more likely to be food secure (0.2 percentage points per year), which may reflect accumulated assets and social networks, although the direction was reversed in Ekiti State, where age had a positive coefficient (0.113). This modest effect suggests that coping behaviours offer short-term relief rather than a lasting route out of food insecurity, and that reliance on them, for example through skipping meals or selling assets, can erode future productive capacity.

*Education and farming experience.* Education (0.098) and farming experience (0.069) had positive coefficients, and each increased the probability of being food secure (by 0.7 and 0.5 percentage points respectively) and raised the probability of mild food insecurity. This result runs against the common expectation that schooling and experience improve food security, although Babatunde *et al*. (2007) also identified both variables as important determinants of food security among farming households. Several explanations are plausible. Better-educated and more experienced household heads may hold higher expectations about food quality and variety, which the FIES items capture more readily. Education may also draw household labour towards non-farm activities and away from food production. Long-serving farmers may rely on traditional practices and be more exposed to accumulated input-cost pressures. The result deserves further investigation with panel or qualitative data. Household size was significant only in the state models, negatively in Ogun State (−0.071) and positively in Oyo State (0.310), which points to differences in how household labour and consumption needs balance out locally. Extension contact was not significant in the pooled model (0.223, $p = 0.122$), which is consistent with the low frequency of extension visits.

*State-level patterns.* The state models show that the determinants of food insecurity are not uniform across the region. In Ogun State, the significant variables were household size, farming experience, cooperative membership, resource allocation and the coping strategy index, so that institutional and household-management factors dominated. In Oyo State, which had the highest incidence of severe food insecurity and the best-fitting model (pseudo $R^2 = 0.299$), age, marital status, education, household size, farming experience, income, resource allocation and coping strategies were all significant, which points to a more heterogeneous set of pressures on households. In Ekiti State, age, marital status, education, extension contact, resource allocation and, at the 10% level, coping strategies were significant, while household size, farming experience and income were not. The very large resource allocation coefficient for Ekiti State (−12.994) should be read as a sign of strong sensitivity of food-security status to resource allocation in a small sample rather than as a precise magnitude. Together, these differences reinforce the need for state-specific programme design, with resource-management training and safety nets targeted more heavily at Oyo and Ogun State.

## 4. Conclusion

The study assessed food insecurity, household resource allocation and coping strategies among 600 rural farming households in Ogun, Oyo and Ekiti States. Food insecurity was widespread, with only 8.0% of the households food secure and almost half (48.5%) severely food insecure; the situation was worst in Oyo State. Radio, friends and neighbours and mobile phones were the main sources of nutritional information. Most households relied on low-level coping strategies, but almost a quarter (23.0%) were already using medium or high-level strategies that signal stress. Household resource allocation was strongly related to food insecurity, food insecurity differed significantly among the states, and the ordered logit analysis showed that resource allocation, education, farming experience, income, cooperative membership, age and coping strategies were associated with better food-security outcomes. The findings show that food security among rural farming households depends less on the mere presence of resources than on how income, inputs, labour, time and social amenities are allocated and supported by institutions. The study covered three of the six Southwestern states and used cross-sectional data, so the results should be generalised to the whole zone with caution.

## 5. Recommendations

Based on the findings, the following recommendations are made:

1. Government agencies and non-governmental organisations should implement educational programmes, including training, field visits and on-farm demonstrations that improve farmers' knowledge of resource management, financial literacy, budgeting and improved agricultural practices.
2. The frequency and quality of extension contact should be increased.
3. The formation and sustainability of farmers' cooperatives should be encouraged through grants, credit, input subsidies and capacity building, because membership improved food-security outcomes.
4. Nutrition education should be delivered through radio, mobile phones, health workers and community networks, the channels most used by the households, while digital literacy and rural internet access are gradually expanded.
5. Social safety nets, such as cash transfers, emergency food assistance and savings groups, should be established or strengthened to prevent households from turning to damaging coping strategies such as skipping meals and selling assets, with priority given to Oyo and Ogun States, where severe food insecurity is highest.
6. Investment in rural roads, electricity and water supply should be increased to improve market

access, food preservation and the effective use of household resources.

7. Policies should encourage income diversification, value addition and access to off-farm employment, to raise household incomes and strengthen resilience to shocks.

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