

Economic Access, Social Capital, and Household Food Security among Smallholder Farmers in Lafia, Nigeria: Evidence on Income, Cooperative Membership, and Agricultural Support Services

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Abstract

Household food-security status and its socioeconomic correlates in a rapidly changing secondary-city economy were studied for across-century farming households in Lafia Local Government Area (LGA), Nasarawa State, Nigeria, from the resource perspective of food access. Data were obtained at the macro-level through a structured questionnaire and a multistage household-sampling procedure with a cross-sectional design. While the thesis documented the sampling universe and a target sample of 400, 120 consistent observations across the socioeconomic (Table 1) and food-security (Table 2) were used in all the thesis econometric tables (hence journal article), then the inconsistency was noted as a data-quality limitation. Food security status was measured through an expenditure index with two thirds of mean monthly per-capita food expenditure, then descriptive statistics and binary logistic regression selected. 74 (61.7%) households were food secure (hidden in Table 2), while 46 (38.3%) were food insecure (naked in Table 2), in general. The majorities of respondents were small farm operators of 1-3 ha (76.7%), relied on family farms for their food (85.0%), and were non-cooperative members (75.8%). Total household annual income and cooperative membership were the only statistically significant positive predictors of food security, while the rest (educational attainment, years of farming experience, farm size, and household size) were positive but statistically insignificant and extension contact and gender were negative and insignificant. The results underscore purchasing power and cooperative-based social capital in income-generating activities (credit, inputs, information, markets, and food). Therefore, the author advocates income-diversification, inclusive cooperative development, integrated financial and extension services, and institutionalization of food-security measurement, but the model should be re-estimated with respondent-level data in the journal article.

Keywords: Household Food Security, Household Income, Cooperative Membership, Smallholder Farmers, Social Capital, Agricultural Extension, Livelihood Diversification.

Introduction

Food security can be defined as assured access to sufficient, safe, and nutritious food to maintain a healthy and active life (Food and Agriculture Organization [FAO], 1996). At household level, it includes food availability, economic access to food, utilization, and stability. For smallholder households, majority of food security comes from own production, but income, land, labour, education, credit, extension services, market interactions, and social networks, all influence on access to food.

The increasing significance of economic access to food is increasingly illuminated by the

context of African secondary cities. Urban and peri-urban households tend to sustain mixture of own production, purchased food and non-farm livelihood strategies. As the settlement enlarges and the household's consumption becomes more monetarised, but food security increasingly depends on the volume of food self-produced, borrowings, purchases, production inputs and coping capacity to weather shocks, in terms of prices or income – the role of employment and income systems is acknowledged across cases in sub-Saharan Africa (Blekking et al., 2020).

Lafia, the capital town of Nasarawa State, Nigeria, has grown administratively, educationally, commercially and populationally. The economy however, still has a large low productive subsistence farming base consisting of small holder production of cereals, roots and tubers, pulses, vegetables, and livestock. The farming households occupy a transitional livelihood setting where a significant number consume the production from their farms while making purchases from markets and engaging in non-farm activities. Research is needed on which resources separate food and food insecure households, in order to inform policies for safeguarding livelihoods through socio-spatial transitions.

Cooperative membership is a critical question. While cooperatives can cut transaction costs and coordinate collective purchase and sale, they can also enhance access to credit and inputs, circulate information, and buffer seasonality. The true value of cooperatives is actually a social and institutional capital. Their effectiveness still depends on accessibility, governance, costs of membership, quality of services, and inclusion. If few farmers join, many households will not access the systems that can strengthen their resilience.

The source thesis coalesced a four decades (1950–1990) land-use/land-cover study with a household food-security survey. A separate manuscript Urbanization and Household Food Security in Lafia Local Government Area, Nasarawa State, Nigeria: A Geospatial and Socio-Economic Analysis, 1984–2024 already combines those spatial and socio-economic components. Mere repetition of that approach would result in a significant redundancy. This study, therefore, advances a unique contribution through the focus on the household-level nexus of food security, income, cooperative membership, farm structure, and agricultural services while eliminating the remote sensing aspect.

The study addresses three questions:

What are the important socio-economic and farm profiles of the sampled smallholder households?

What percentage of the households analysed are food secure based on the expenditure classification?

Which measured socio-economic factors are associated with household food-security status?

The article offers a limited foundation for livelihood, cooperative, and agricultural-support policy in Lafia and other similar secondary cities of Nigeria.

Literature Review and Analytical Framework

What is Household Food Security?

The modern concept of food security has moved from aggregate food production. According to the World Food Summit definition, food security exists when all people, at all times, have physical and economic access to the minimum amounts of safe and nutritious food they need to meet their dietary needs and preferences for an active and healthy life (FAO, 1996). Food security is therefore based on four interrelated aspects: availability, access, utilization and stability. Availability refers to physical supply of the right kinds of food by production, trade and other flows; access refers to households' ability to acquire income, assets, entitlements and the ability to purchase them; utilization focuses on dietary quality, food safety, preparation, health and intra-household food distribution; stability refers to durable access to food at all times in order to avoid shocks of seasonal variation, economic or climatic fluctuations or social disruptions.

Recent pan-global evidence reiterates the significance of economic access. As per the 2024 State of Food Security and Nutrition in the World report, 35.4 percent of the world's population (roughly 2.83 billion people) couldn't afford a healthy diet in 2022, with the majority of the world's population living in low-income countries (FAO et al., 2024). This distinction is significant for Lafia: although food may be available in local markets, it may not be affordable for households with low, or declining income. It also implies that a household can meet an energy or expenditure benchmark without necessarily having dietary diversity or nutritional adequacy.

Given the multidimensional nature of food security, no single indicator is wholly adequate.

That most often used are: per capita food consumption / expenditure, Food Consumption Score, Household Dietary Diversity Score, Household Food Insecurity Access Scale, Food Insecurity Experience Scale, Household Hunger Scale, and Coping Strategies Index. Expenditure data are useful indicators of command over food and allow for comparisons between households on the basis of an economic threshold, but are prone to measurement error due to prices, household structure, recall bias, valuation of own-produced food, and the time period used. Kunzekweguta et al. (2025) argue that dietary, experiential, behaviour and self-assessed measures measure different dimensions of food security. Given this it should be noted that the expenditure index used in this research provides an indication only of the economic extent of access to food.

Money, Livelihood and the Food-access Pathway

Money is simply another form of resource that is crucial to livelihood security. The interaction between general (including itself) and specific resources to determine food access can be viewed as follows:

Income affects food security through cash or non-cash purchasing power, production or income smoothing capacity and risk management capacity. Higher and more stable income enables households to purchase food when own production is limited, acquire better inputs, pay for transportation and storage and helps to cushion the impact of increases in food prices or of crop losses. In urban and peri-urban Africa, employment structures whether formal or informal are directly intertwined with access to food, since in urban and peri-urban Africa most households are part of the ‘formal’ or ‘informal’ food markets (Blekking et al., 2020). Nance of income becomes more important where domestic food prices are volatile and the costs of healthy diets are rising faster than household income.

The livelihood approach separates measures of average income from measures of income variability and range or stability. A farm living from a single rain-fed crop harvest might appear to have satisfactory year-to-year income levels but then have enormous seasonal shortfalls. Mixing cash flow from crop production and livestock with processing, trading, casual work, remittances or service income would alleviate this risk and provide a more stable income stream. But that does not necessarily mean households benefit from diversification, as the survival activities with the lowest returns would be more likely to be signs of poverty and hardship. An analysis could, and probably should, unpack sources of farm income, non-farm enterprise income, wages, transfers, all by their time of occurrence and the degree of certainty.

Own production is still essential for smallholder households. Size, labour, experience, land tenure and access to services can affect production and availability for own consumption. Larger farms do not necessarily have higher security. The definition of productivity, needs of the household, price of products, input prices, losses post-harvest, share of output sold and own consumption are also aspects to consider.

Livelihood Perspectives and Social-capital Theories

A new way of thinking and explaining 3 interventions applied to coastal forest management At the beginning of this research, the livelihood framework and social-capital perspective are since 1990s, widely used in the field of sustainable development. The life of people is viewed as complex and dynamic systems, in particular in the development process; the deficiencies of which many people are suffering are cause of a lack of development (Scoones, 1998). In the livelihood framework proposed by Scoones (1998) two limits of UNSIP are explained: the lack of assets/tools and the weaknesses of strategies adopted by local people.

The Sustainable Livelihoods perspective offers a convenient approach to link household asset profiles to food security outcomes. Households adopt strategies that are “dependent upon access to five types of capital: human (education, skills, health, labour); natural (land and water); physical (roads, storage, equipment, irrigation); financial (income, savings and access to credit); and social (networks, trust, collective organizations and reciprocal support).” 6 Institutional factors and vulnerability context show what comes between the various assets and the livelihood outcomes of households.

According to this perspective, annual income is an indicator of financial capital, farm size is an indicator of natural and productive capital, education and experience are indicators of human capital, extension contact indicates institutional access, and cooperative membership is an indicator of organized social capital. Simply having a certain asset no doubt will not guarantee food security. For example, credit will be of little use if the household has no access to markets and no access to technical assistance; growing the recommended inputs will be of little use if the household has no credit.

Social capital is broadly conceived as the relationships, networks, norms, and organizations that people can draw upon to facilitate cooperation and performance. Agricultural cooperatives convert social capital into tangible services. When purchasing collective inputs, costs are reduced; savings and credit programs support liquidity; marketing collectively strengthens bargaining; and, shared information backs technology adoption or coping with market fluctuation.

There are various avenues through which a relationship between membership and food security can operate. Membership can lead to higher levels of production, income stability, better access to markets, increased bargaining power, lower input costs, subsidized credit or even help households mitigate seasonal shortfalls. Such Nigerian evidence validates the above explanation on the contribution of social capital (SC) to food security. Kehinde et al. (2021) revealed that the effect of SC on productivity and food security was positive among cocoa-farming households of south western Nigeria; and, a combined effect of access to credit and cooperative services on productivity was better than individual services, providing an example of the substitution of institutional services.

Some newer studies find the same for Nigerian smallholders: the difference in welfare (production, income, or other asset) between cooperative members and non-members is positive (Kehinde et al., 2025). But membership is selective; more resource-rich, better-connected, more educated, more commercially oriented households and those with larger farms may be more likely to participate. Cross-sectional comparisons without controlling for self-selection and other differences between members and non-members tend to overestimate effects. Equivalent findings come from matching, endogenous switching, instrumental variables, or panel studies.

Women could be discriminated against in land, finance, extension and organization access. Doss et al. (2018) warns against oversimplification of women's roles in agriculture and highlights the importance of having evidence to support notion of heterogeneity in rights, roles, access and control over resources. Cooperative policies should evaluate precisely at membership, decision-making, access to loan and group services who can become members. Simply noting the number of members does not give any idea about voice, leadership, post-subsidy benefits or impact of social norms on intra-household food distribution.

Cooperative Evidence, Unresolved Mechanisms, and Gaps in Research in Africa

The following principles form the basis of all our cooperative evidence analysis:

Generally, the wider array of African literature associates cooperatives with productivity, income, market participation, and food access, although the evidence is patchy. In the Kunzekweguta et al.'s (2025) scoping review, a minority of the African studies directly linked cooperative membership to a clear food-security indicator; most inferred food-security improvements indirectly based on productivity or income or occasionally based on both combined. The review identified this effect in the wider literature as more prominent in terms of food availability and access than for dietary utilization and year-round stability.

These are relevant considerations for the Lafia study. A positive membership coefficient is compatible with an economic-access mechanism, but leaves open which of credit, cheaper inputs, greater yields, collective marketing, savings, consumption smoothing, information, or mutual support is operative, and whether the outcome of better diet quality, or nothing, persists across lean seasons. A more robust design would aim to gather data on the cooperative services that were actually accessed, the household's length of membership, the levels of participation, the quality of governance, the level of credit accessed, the prices accessed, and the changes in food consumption.

Co-operatives may also have unequal impacts. Cost, membership's fees, payment, meeting frequency, remoteness, literacy level, political capture, or lack of accountability may pose barriers to

participation for poor households. Top-down producer groups formed primarily to scale-up provision of in-come transfers are unlikely to generate long-term ownership among members. So the main analytical question is not only whether co-operatives exist but which and whether which cooperative functions work for whom in which institutional environment.

Extension, Education, Resources on Farm and Structure of Households

Education can enhance ability to access information, scrutinise innovations, record information and diversify livelihood strategies. while experience of farming (born into a farming household) may help to reinforce indigenous knowledge, individual experience alone will often not be sufficient to surmount constraints relating to inputs, climatic, land or market constraints. It is expected that extension will link farmers to improved practice and public services but contact itself is not sufficient to deliver farmer support. The extent to which extension will improve a situation depends on the effectiveness of contact, which is determined by frequency, appropriateness, timeliness, inclusiveness and the human and physical resources available to apply the advice.

The farm size can increase the own-food production and the marketed surplus, but the impact is conditional on land quality, land fragmentation, labour endowment, technology, crop selection and tenure security. The household size has an ambiguous impact in the theoretical model: the higher household size increases the food needs, but working age household members can be a source of labour supply or income diversification. The gender impact rests on the given definition of headship and the distribution of land, labour, income and decision-making within the household.

Empirical Synthesis and the Contribution of Lafia Study

The literatures offer four hypotheses. First, income should be positively related to food-security as the basis of purchasing power and a potential hedge against positive and negative shocks to food production and consumption. Second, cooperative membership should positively influence food- security as an integrated bundle of markets and social services, though selection considerations need to be thought through in interpretation of the results. Third, farm, education, household, and extension variables may serve as dimensions of the assumed causal pathways rather than as additional pathways. Fourth, expenditure-based food-security measures reflect access but should be supplemented by dietary and experiential measures.

Limited evidence is available for the secondary-city areas of north-central Nigeria where smallholder households primarily by combining own production, market purchase and non-farm activity. The bulk of the Nigerian cooperative research has focused on the south western region, especially cocoa, with forms of analysis centered on productivity or poverty, and rarely on household access to food. The Lafia study responds to this absence of focus on outcomes by exploring an expenditure-based food-security classification, using it in conjunction with measures of income, cooperative membership, farm resources, human capital, household characteristics, and extension contact.

The framework adopted empirically to analyze the form of food security of the household is specified as follows Food security (in/availability/consumption) is a (a) function of farm-specific and household-specific variables. Household-specific variables are income, and cooperative membership that reflect the financial and institutional resources; education, and experience that reflect human capital; household size that reflects the consumption demand and labour available; while farm-specific variables are farm size, and extension contact and gender, which represent a productive asset and service access respectively. As this design is used on a cross-section data, a direct causal interpretation of these relationships would not be appropriate.

Materials and Methods

Study Area

Lafia Local Government Area (LGA) is the capital of Nasarawa State in the north-central part of Nigeria. Situated in the Guinea Savanna ecological zone, Lafia experiences a clearly pronounced wet and dry season. Lafia provides administrative, educational, health, transport and market facilities for the surrounding settlements. The economic activities of the LSMA are largely drawn from public and private services, trading and small scale manufacturing enterprises, crop and livestock production.

Some of the major crops identified in this thesis are millet, sorghum, groundnut, cowpea, cassava, yam and dry season vegetables.

The setting is appropriate for a household food-security study because the livelihood systems are either smallholder or market-based. Some households are able to use food from their own farms, buy some extra, and also fall back on farm and non-farm income. Economic access and institutional support are key to food-security results in this mixed system.

Research Design, Sampling and Data Validity/Accuracy

The data was collected through cross-section household survey including interview and field observation. The method is outlined in the thesis as a multistage sampling procedure whereas the planned sample size was calculated based on the formula of Taro Yamane. The personal data were collected through the structured questionnaire on the profile, education, household size, participation in cooperative, farm size, land tenure, sources of food, expenditure of food, income, contact with extension and farming experience, the standardized questionnaire.

A data-integrity audit was conducted in the process of translating the thesis into this article. While the thesis repeatedly states a target, or total, sample of 400 respondents, category frequencies within the socio-economic table add to 120 in each Food-Security table and have 74 and 46 food-secure and insecure households, respectively, summing also to 120. Percent values of 86.7%, 24.2%, 61.7% and 38.3% are directly translated to denominators of 120. Therefore, the sole internally justifiable analytical sample from the document supplied is $n=120$.

This article states $n = 120$ and makes the stated target different to the documented analysed sample. It does not calculate the percentages into fictitious frequencies based on 400 households. Could we examine the respondent-level dataset to establish which 280 cases were not included, excluded or lost in the tables?

Food Security Indicator Items

All items were loosely based on the core food security indicator questions, namely Food available, Food quality and safety, Quantity and nutritional quality, Control over purchase, preparation and consumption, and Food-related role and responsibilities.

Household food-security status was estimated based on per-capita monthly food expenditure. Using the expenditure-index method as used in the thesis, the cut-off point was set at two-third of the sample mean per-capita monthly food expenditure namely:

$$F_i = \frac{\text{per-capita food expenditure of household } i}{\frac{2}{3} (\text{mean per-capita food expenditure of all households})}$$

Households with were classified as food secure, and those with as food insecure. The thesis shows two contradictory threshold values: 40,712.50 in the results narrative, and 27,141.67 in a table footnote. Since 27,141.67 is roughly two-thirds of 40,712.50, the clearest conclusion is that 40,712.50 was the sample mean, and 27,141.67 was the classification threshold of $2/3$ this conclusion is adopted, pending confirmation from the data.

Explanatory Variables for Single Species Populations and Statistical Analysis

Descriptive statistics summarized gender, marital status, education, household size, membership in the cooperative, farm size, landholding size, land tenure status, and sources of food. Since the categories of the variables land acquisition and sources of food could multiple responses, they did not sum to 100%.

Food-security status was also modelled by the use of binary logistic regression. In the thesis, this was actually modelled with a binary food secure (coded as 1) and food insecure (coded as 0). The indicators of food security included years of formal education, years of farming experience, annual household income, farm size, household size, extension contact, sex and cooperative membership. The model is:

$$\log\left(\frac{P_i}{1 - P_i}\right) = \beta_0 + \beta_1 \text{Education}_i + \beta_2 \text{Experience}_i + \beta_3 \text{Income}_i + \beta_4 \text{FarmSize}_i + \beta_5 \text{HouseholdSize}_i + \beta_6 \text{Extension}_i + \beta_7 \text{Gender}_i + \beta_8 \text{Cooperative}_i + \varepsilon_i$$

Where P_i is the probability that household i is food secure. Statistical significance was evaluated using the p-values reported in the thesis. The source labels one column “t-stat,” although logistic regression ordinarily reports a Wald statistic, z-statistic, or related test. The exact statistical package and coding scheme were not documented clearly enough to relabel the statistic, so it is presented as “reported test statistic.”

Results

Household and Farm Characteristics

Sample analysed was mostly male led as 104 (86.7%) out of 120 participants were male and 16 (13.3%) were female. Ninety three (77.5%) out of 120 participants were married. Level of education varied with 36 (30.0%) out 120 participants having no formal education and 84(70.0%) attained primary, secondary and tertiary levels.

The average household size was quite large. Fifty-eight (48.3%) of the households had between one and five people, 49 (40.8%) had between six and ten, 11 (9.2%) had between 11 and 15, and two (1.7%) had 16 or greater. The number of people living in a household was reported to be on average six.

29 respondents (24.2%) were members of a cooperative and 91 (75.8%) were not. The farms were small scale: 92 respondents (76.7%) cultivated between 1 and 3 hectares, 17 (14.2%) between 4 and 6 hectares and 11 (9.2%) over 6 hectares. The mean size of farm was reported as 2.64 hectares.

Table 1. Selected socio-economic and farm characteristics (n = 120)

Indicator	Category	Frequency	Percentage
Gender	Male	104	86.7
	Female	16	13.3
Marital status	Married	93	77.5
	Single	22	18.3
	Widowed/separated	5	4.2
Education	No formal education	36	30.0
	Primary	29	24.2
	Secondary	27	22.5
	Tertiary	28	23.3
Household size	1–5 persons	58	48.3
	6–10 persons	49	40.8
	11 or more persons	13	10.9
Cooperative membership	Member	29	24.2
	Non-member	91	75.8
Farm size	1–3 ha	92	76.7
	4–6 ha	17	14.2
	More than 6 ha	11	9.2

Source: Field survey (2025). Percentages may differ slightly from 100 because of rounding.

The thesis mentions the inheritance of land to 99 individuals (82.5%); the purchase of land to 33 individuals (27.5%) and the renting of land to 18 respondents (15.0%). Since these frequencies sum to more than one the sample, they were clearly multiple and overlapped responses to land ownership. There were a corresponding 102 households (85.0%) who produced food on their own farm and 69 (57.5%) who purchased food, also indicating that production and purchase were often to be undertaken together.

Table 2. Land access and household food sources (multiple responses)

Domain	Response	Frequency	Percentage of households
Land access	Inherited	99	82.5
	Purchased	33	27.5
	Rented	18	15.0

Food source	Family farm	102	85.0
	Market purchase	69	57.5
	Donation/gift	2	1.7
	Other source	1	0.8

Source: Field survey (2025). Multiple responses were permitted; percentages do not sum to 100.

Household Food-Security Status

By means of expenditure index, 74 households (61.7%) classified as food secure and 46 (38.3%) as food insecure. This implies majority of the households fall where the expenditure gap lies, whereas most two in every five households did not.

Table 3. Expenditure-based household food-security status (n = 120)

Food-security status	Frequency	Percentage
Food insecure ()	46	38.3
Food secure ()	74	61.7
Total	120	100.0

Source: Field survey (2025). Classification threshold interpreted as ₦27,141.67 per person per month, pending verification from the respondent-level data.

The measure should not be interpreted as an indicator of complete nutritional security. A household may have higher expenditure than the cut off line but consume a narrow range of diet, or consume foods under seasonal variations; on the other hand, a household with high reliance on own production may have low cash expenditure but consume foods in subsistence-levels.

Socio-economic Factors related to Food Security

The regression table suggests only annual income and cooperative membership are significant, positive determinants of food-security status. The reported coefficient of annual income is 8.745 ($p=.005$) and cooperative membership is 0.287 ($p=.002$). Both estimates move in the anticipated direction, with the conceptual argument suggesting that the higher (lower) value of the former (latter) indicator increases (reduces) the food-security status.

Education (0.008), experience of farming (0.019), size of farm (0.043) and size of household (0.036) were positive (not significant). Extension contact (-0.008) and sex (-0.453) were negative (not significant). This result of non-significance means that the model analysed could not provide supporting evidence of an independent association at conventional levels; this does not imply that the variables examined are not important in their function in other places.

Table 4. Reported binary logistic regression of household food security

Predictor	Coefficient	Standard error	Reported statistic	p-value
Constant	1.011	0.375	2.692	.008
Years of formal education	0.008	0.019	-0.410	.683
Farming experience	0.019	0.045	0.413	.681
Annual household income	8.745	0.000†	3.654	.005**
Farm size	0.043	0.071	0.603	.548
Household size	0.036	0.030	1.223	.225
Extension contact	-0.008	0.183	-0.043	.966
Gender	-0.453	0.280	-1.614	.110
Cooperative membership	0.287	0.047	6.085	.002**

Source: Field survey (2025), reproduced from the thesis regression table. $p < .01$. †The reported standard error of 0.000 for income is internally inconsistent with the reported coefficient and test statistic and requires correction from the statistical output. The thesis reports “ $R^2 = 0.492$,” but the type of pseudo- R^2 is unspecified.

The income estimate can’t be converted into an odds ratio with any confidence without clarifying the income unit, the transformation and the incorrect standard error. Likewise, the cooperative coefficient would convert into an odds ratio of about 420 and if the coding of cooperative

membership was 1 for being a member and all other model parameters were correct. To keep from overstating the article highlights sign, significance and substantive interpretation over unverified marginal effects.

Discussion

Income, the Basis for Access to Household Food

The large positive income coefficient lends support to the notion that food insecurity in Lafia is partly an economic-access issue. Though most households received food from family farms, 57.5% bought some as well. Own production thus did not completely erase reliance on markets. Households still needed cash for other foods, paying transport costs and subsistence periods between harvests.

Such lack of resilience corresponds to some of the research suggesting conditions of employment and income are key factors in determining food security of sub-saharan cities (Blekking et al., 2020). It can also be related to FAO et al. (2024)'s broader research of the affordability challenge that even a good food supply can be insufficient where household purchasing power is weak. In the more diverse urban-agrarian economy of Lafia, income diversification is important and the smallholders are likely to find processing, trading, services or craft, seasonal employment or other off-farm options that will smooth income without necessarily making farming redundant.

The source model does not address differences in sources of income, such as: farm size, non-farm income, benefits of cooperatives, education, or other unobserved variables. Future analysis should disaggregate farm income, wage income, enterprise income, remittances, and transfers. It should also test for income consistency, as irregular income flows could cause food insecurity even where annual totals are sufficient.

Membership in Cooperatives and Household Resilience

Although participation was low, cooperative membership was positive and significant. Only 24.2% of households were cooperative members. It implies that there is potential for farmer organizations to increase food security. Co-operatives could be used in increasing access to inputs, collective marketing, savings, credit, training, bargaining power and also smoothing consumption in lean season.

This result is consistent with Nigerian evidence relating social capital with productivity and food security (Kehinde et al. 2021), and with observation that coupled access to cooperative and credit service could produce more relative livelihood benefits than separate access (Kehinde & Ogundeji, 2022). Likewise, the result supports existing evidence of the capacity of cooperative membership to lift Nigerian smallholders out of poverty (Kehinde et al., 2025). However, the result should not be taken as evidence of a causal relationship. It is possible that the better-off or more market-oriented farmers are more willing to become cooperative members. It is also quite possible that the quality of cooperative service provision varies considerably. Despite these caveats, the finding warrants further policy scrutiny of issues of membership entry, service delivery, governance and participation.

Expansion should be focused on functional, not nominal cooperatives. Many group registrations will not be very useful unless the groups' services are transparent, the leadership accountable and the memberships affordable – and unless they have genuine linkages to finance and markets. This note is more cautious than the broader African review by Kunzekweguta et al. (2025), which indicates that cooperative-food security mechanisms have been very weakly researched, (with the evidence being strongest on availability and access, rather than, e.g., nutrition or stability) and that mechanisms of access have tended to benefit existing producers engaged in larger, more expensive farms – thus there is a case for finding different entry mechanisms for 'improver' groups, especially women, young farmers, tenants and smallholders.

Small Farms, Diversified Food Sources and Exposure to Risk

The expansion of small farms many of whom are integrated into diversified systems of production, marketing and consumption, into the global market will lead to increasing integration, through the types of foods they produce, and by increasing numbers. Leading to greater exposure to risk for the small farms themselves. However if part of the implications of specialization is an increasing concentration of risks, further specialization and integration into the global market will

invite even greater exposure to risk for both producers and consumers.

Over $\frac{3}{4}$ of the interviewees cultivated 1–3 ha, with an average farm size of 2.64 ha. The farming system was thus mainly based on smallholder farms. 85% of the respondents obtained their food from family farms, underlining the importance of own production. But the combination of own food and market sales reveals that household food security increasingly relies on purchasing power.

Farm size was positive and non-significant in the model. A few hypotheses are worth mentioning. Land quality, crop composition, labour and inputs used, irrigation and productivity differences, and household consumption needs may be more critical than farm size. Alternatively, the model could be too weak, especially with only 120 observations. Policies targeting sustainable intensification, storage, processing, and market access might have more impact than the expansion of cultivated area.

Additional Changes to Marriage and Gender Distinction: Interpreting Insignificant Estimates

Extension contact is negative and insignificant. However this does not necessarily imply that extension is damaging to food security. It could be that quality of service is poor, or that contact is infrequent, or that the targeting of the more vulnerable is reversed, or that the measurement of contact is crude, or that some other important factor omitted. Policy should take action to explore what extension agents can offer, who they offer it to, and whether advice arrive at the optimum time, and whether the household can purchase the products needed to implement the advice.

Gender was also negative and non-significant. Only 16 females responded meaning that the power was too low and the estimate too unstable. The dominance of males in the sample may be due to the survey selecting household heads, rather than being a true reflection of agricultural labour and decision making, which Doss et al. (2018) point out cannot be understood in terms of sex of household head alone. Future research should measure ownership, income control, labour inputs, credit access and decision-making separately.

Contribution to the Paper of Geospatial Urbanization

The contribution of this paper is institutional and livelihood specific. It doesn't quantify land-cover changes, link the migration of farmland to urban expansion or integrate satellite and household data from 1984–2024. It rather finds income and the cooperative participation to be the main significant correlates in the maintained household model and investigates what policies produced the latter relationships.

The distinction facilitates independent publication: the geospatial paper can be submitted on long-term urban land-change and outcome on food-supply relationships, and the current paper on household economic access, smallholder organization, and social capital using the 2025 survey. Any submission should, however, reveal the common thesis dataset and cross-cite other articles according to the journal policy.

Policy Implications

To contribute to creating a Diversified and Stable Household Income

Food-security programmes should integrate assistance to agriculture with sustainable options for off-farm livelihoods. Capacity building, support to small-enterprises, value-added processing, servicing markets, providing processing facilities can help mitigate risks of relying on one harvest and smoothen internal cash flows.

Reinforce Inclusive Agricultural Cooperatives

Support should be oriented towards collaboration with governance, transparent accounting, training of members, capacity building of savings and credit, working capital & input purchase and collective marketing & storage & processing. Indicators of performance should be targeted at services and member outcomes instead of registration.

Reduce Barriers to Participation

Cost of membership, travel, registration, presence of papers, red tape, mistrust, management by elites, and low profile should be evaluated. Special inclusion index might be needed for women, young farmers, yard tenants and very small producers.

Extending the Delivery of Reform

Extension initiatives need to be more than a mere advisor of contacts. Evaluation of the service should also include the extent of relevance and timeliness, adoption and productivity, post-harvest benefits, market access and impact on food-security. Such participating pathways could easily take the form of cooperative structures, while existing outreach channels could help no the members from being marginalised.

Better Food-security Measurement and Monitoring

Disaggregation of future household monitoring data with separate expenditure aggregates alongside validated experience-based indicators, dietary diversity measures, seasonal and timeliness factors, and livelihood variables would allow differentiation of economic access from nutritional quality and short term coping.

Limitations and Data-quality Requirements

Several limitations have material implications for interpretation. First, the thesis reports a target sample of 400 with internally consistent results for 120 households. This paper employs the documented analytical denominator of 120; the authors will have to reconcile this flow for submission.

Second, the threshold story does not add up. The median per-capita monthly food expenditure is ₦40,712.50 and the two-third of food-security threshold is ₦27,141.67, though this should be cross-checked in the calculation sheet.

The regression table shows an SE of 0.000 for the annual income, inconsistent with the coefficient and test statistic. The unit for income or transformation is not clear, the statistics column is headed “t-stat” despite the logistic form, and the trend in the model building is not visible. The form must be re-estimated and also reported with coding definitions, appropriate standard errors, Wald or z statistics, odds ratios with 95% confidence intervals, model chi-square, pseudo R² type, classification performance, multi collinearity, and goodness-of-fit.

The cross-sectional design establishes correlations, not causal effects. Membership in cooperative may be associated with food security for reasons other than the effects of membership itself. For example, cooperative membership and food security may both depend on income, motivation, commercial orientation or social networks. 5. The expenditure threshold only measures one aspect of household food security and may lead to underestimation of food security in people who depend on their own production.

Conclusion

The evidences analysed indicated that 38.3% of the 120 registered households suffered from food insecurity according to the expenditure related classification. The group of households was characterized by small farm holdings, primarily depended on family farm production and, at the same time, used food markets as a source of food. In the regressions archived, the only statistically significant positive predictors were annual income and cooperative membership.

The results place household food security policy in Lafia, with the focus on both purchasing power and social capital. Diversification of income may enhance food access and security, while effective cooperative organizations can ease access of smallholders to credit, information, inputs and markets. Such measures should be coupled with inclusive membership rules, accountable governance, improved extension and enhanced measurement.

Encouraging findings for now not contemplated to make any unconditional statistical inferences. Confirmation of the consistency between the sample size, threshold and regression output is needed prior to submitting further. When confirmed the research provides a unique perspective from which to view livelihood with time sensitive analysis since the food security experienced in the Nigerian secondary-city depends on the nation’s socio-political and economic institutional reforms.

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