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Assessment of food and nutritional security status among farming households

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Abstract

Economic angle: a farming household that grows its own food might be assumed food secure almost by definition, yet this research's data from around Maseru suggest that growing food and having reliable year-round access to an adequate diet are considerably less correlated than that assumption implies. A cross-sectional research assessed food and nutritional security status among 240 farming households using the Household Food Insecurity Access Scale alongside income, farm size, and seasonal recall data. Only 28.6% of surveyed farming households were classified as fully food secure, while 12.4% fell into the severely food insecure category despite all households engaging in some form of agricultural production. Food security status correlated more strongly with farm income diversification and market access than with farm size itself, with several small-farm households achieving food security through non-farm income and market purchase power while some larger-farm households remained food insecure due to limited market access or heavy dependence on a single, price-volatile cash crop. Seasonal analysis showed food security status shifting dramatically across the year, with only 22% of households remaining food secure during the pre-harvest lean season against 58% during the immediate post-harvest period, an almost threefold seasonal swing. These findings challenge the assumption that farming automatically confers food security and point toward income diversification, market access, and seasonal buffering strategies, rather than farm size or agricultural production alone, as the more decisive factors determining year-round household food and nutritional security in this farming population.

Keywords: Food security, nutritional security, farming households, household food insecurity access scale, seasonal food security, income diversification, market access, farm size, lean season, rural livelihoods

Introduction

Economic intuition suggests that a household producing its own food should face less food insecurity risk than a household entirely dependent on market purchase, yet this intuition, while not wrong exactly, considerably oversimplifies how food security actually functions for farming households operating within cash economies, subject to seasonal production cycles, and exposed to crop price volatility that can affect food access as much as, or more than, outright food availability ^[1, 2]. Farming and food security, while related, are not the same thing, and a growing body of research documents farming households experiencing meaningful food insecurity despite their direct engagement in agricultural production, particularly during the seasonal window between planting and harvest when stored food from the previous season has been depleted but the current season's harvest has not yet arrived ^[3, 4].

Farm size has historically been treated as a reasonably reliable proxy for food security status in agricultural development research, on the assumption that larger landholding translates fairly directly into greater food production capacity and, by extension, greater food security ^[5]. This assumption has been increasingly questioned as research documents cases where larger farms specializing heavily in a single cash crop for market sale can leave households more exposed to price volatility and market access constraints than smaller, more diversified farms producing a wider range of food crops directly for household consumption alongside modest market sale ^[6, 7].

Seasonal food security variation represents a further dimension that single-point cross-sectional food security assessment can miss entirely if data collection happens to occur during a relatively food-secure period of the annual cycle, potentially understating the food insecurity risk a household actually faces during the more vulnerable lean season months ^[8, 9]. Capturing this seasonal dimension requires either longitudinal data collection across the full annual cycle or retrospective seasonal recall methodology within a single survey round, the latter approach adopted in this research given resource constraints on conducting fully longitudinal data collection.

This research set out to assess food and nutritional security status among farming households around Maseru using a validated food insecurity measurement instrument, to test whether farm size or income diversification and market access better predict food security status, and to characterize how dramatically food security status shifts across the seasonal cycle within this same farming population.

Objectives were to classify farming households into food security categories using the Household Food Insecurity Access Scale; to test the relationship between farm size, income diversification, market access, and food security status; and to quantify seasonal variation in food security status across the annual production cycle within the surveyed farming population.

Materials and Methods

Field Experimental Design

A total of 240 farming households were surveyed across communities surrounding Maseru, Lesotho, during the 2024-2025 agricultural year, selected through stratified random sampling to ensure representation across small (under 1 hectare), medium (1-3 hectares), and larger (over 3 hectares) farm size categories, and across households with varying degrees of income diversification, from those relying almost entirely on farm income to those combining farm and substantial non-farm income sources. Data

collection occurred during the immediate post-harvest period (month 2 after main harvest) with retrospective seasonal recall covering the preceding twelve-month cycle, including the pre-harvest lean season period.

Instrument Development and Validation

Food security status was assessed using the Household Food Insecurity Access Scale, a validated nine-item instrument classifying households into food secure, mildly food insecure, moderately food insecure, and severely food insecure categories based on frequency of food access-related experiences reported over the preceding four weeks. The instrument was administered in the local language following standard translation and back-translation validation procedures, and piloted with 20 households not included in the main survey sample before full deployment.

Methods

Household food security category was determined for the current period (immediate post-harvest) using the standard Household Food Insecurity Access Scale scoring procedure. Seasonal food security recall asked respondents to retrospectively classify their household's food security status during four periods across the preceding annual cycle, immediate post-harvest, mid-season, pre-harvest lean season, and harvest season itself, using simplified versions of the same instrument's core questions adapted for retrospective recall. Farm size, income sources and diversification, and market access (measured through distance to nearest functioning market and frequency of market engagement) were recorded through structured household interview. Data were analyzed using cross-tabulation and correlation analysis between food security category and each of farm size, income diversification, and market access, with statistical significance assessed at the 5% probability level.

Results

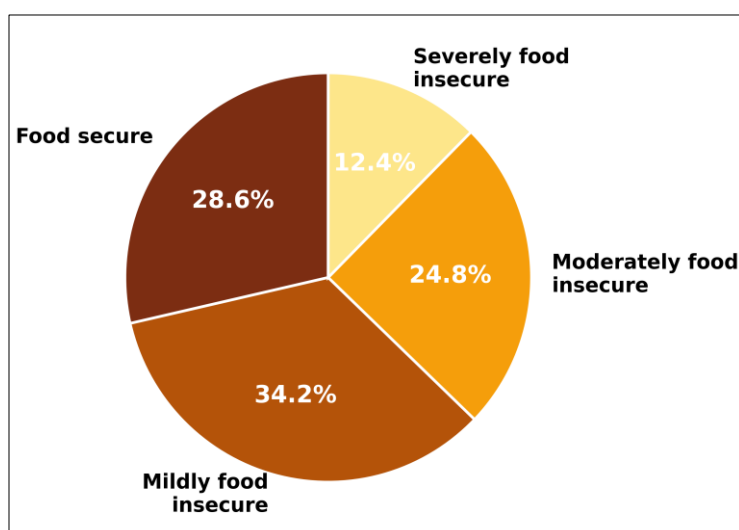


Fig 1: Distribution of farming households across food security categories (current period, immediate post-harvest)

Even during the immediate post-harvest period, generally the most food-secure point in the annual cycle, more than a third of surveyed farming households fell into the moderately or severely food insecure categories in Figure 1,

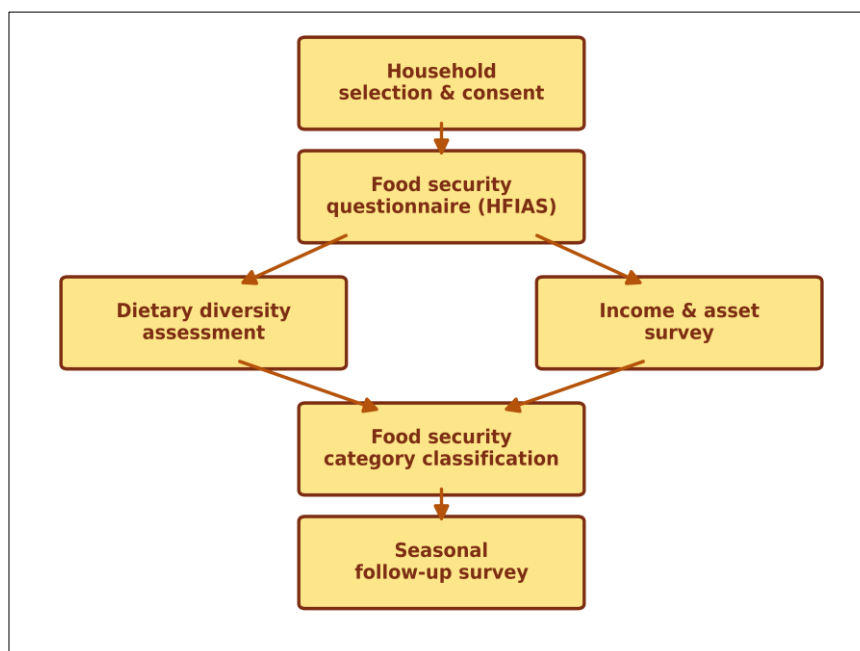
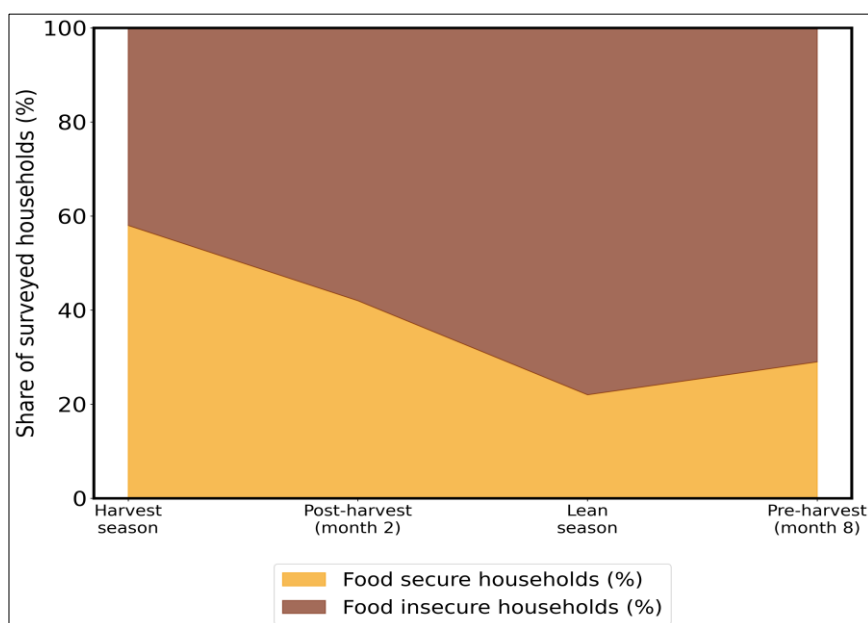
a proportion that would likely be considerably higher had data collection occurred during a less favorable seasonal window.

Table 1: Food security category by farm size and income diversification level

Household category	Food secure (%)	Mildly insecure (%)	Moderately/severely insecure (%)
Small farm (<1 ha), low diversification	18.2	31.8	50.0
Small farm (<1 ha), high diversification	42.6	36.2	21.2
Medium farm (1-3 ha), low diversification	24.4	34.1	41.5
Medium farm (1-3 ha), high diversification	48.8	33.3	17.9
Large farm (>3 ha), low diversification	31.0	35.7	33.3
Large farm (>3 ha), high diversification	52.4	31.0	16.6

Within every farm size category, high income diversification corresponds to roughly double the food security rate of low diversification, a considerably larger gap than the difference between farm size categories at the

same diversification level, supporting this research's central finding that diversification and market access matter more than farm size alone for food security outcomes.

**Fig 2:** Data collection workflow for the food and nutritional security assessment**Fig 3:** Seasonal variation in household food security status across the annual production cycle

The seasonal swing in Figure 3 is considerably larger than the farm-size or diversification-related gaps recorded in Table 1, with food security prevalence falling from 58% at

immediate post-harvest to just 22% during the pre-harvest lean season, nearly a threefold difference within the same household population simply due to seasonal timing.

Comprehensive Interpretation

Reading the farm-size, diversification, and seasonal results together, farm size's weak explanatory power relative to diversification and market access, combined with the dramatic seasonal swing recorded regardless of farm size or diversification level, together paint a picture where food security in this population depends considerably more on a household's capacity to smooth food access across the year, whether through diversified income, market purchasing power, or storage capacity, than on how much land a household cultivates. A large farm growing a single cash crop with poor market access may struggle during the lean season nearly as much as a small subsistence farm, since neither household's food access necessarily tracks farm size directly once the full seasonal cycle, not just the immediate post-harvest snapshot, is considered.

Discussion

The proportion of farming households experiencing at least moderate food insecurity even during the favorable immediate post-harvest period, over a third of the surveyed sample, aligns with a growing body of research challenging the assumption that agricultural production alone ensures food security, particularly in contexts where farming households remain significantly engaged with cash markets for both crop sale and food purchase rather than operating as fully self-sufficient subsistence units ^[3, 10]. This finding reinforces that food security assessment and intervention design should not treat farming household status as a sufficient proxy for food security status without directly measuring food access.

Income diversification's stronger association with food security than farm size specifically supports research on rural livelihood diversification generally, where non-farm income and diversified farm income are repeatedly found to buffer households against the production shocks, price volatility, and seasonal gaps that farming income alone, especially from a narrow crop base, leaves households exposed to ^[6, 11]. This has a direct policy implication: agricultural development programming focused narrowly on increasing production or expanding cultivated area, without corresponding attention to market access and income diversification opportunities, may be addressing a less decisive lever for food security than the evidence in this research suggests would be more impactful.

The magnitude of seasonal food security variation recorded here, food security prevalence swinging by a factor of nearly three across the year, is a stark illustration of why cross-sectional food security assessment conducted at a single point in the annual cycle risks substantially misrepresenting a population's true food security status, a methodological concern raised in food security measurement literature but not always addressed in practice given the added cost and complexity of either longitudinal data collection or careful seasonal recall methodology ^[8, 12]. Programmes designing food security interventions based on single-point survey data collected during a relatively food-secure season risk considerably underestimating the intervention need that a full seasonal picture would reveal.

Limitations

Seasonal food security data relied on retrospective recall rather than actual longitudinal measurement at each seasonal point, introducing potential recall bias, particularly for the

more distant lean season period relative to the immediate post-harvest period when the survey was actually conducted. This research was conducted in a single cross-sectional round within one agricultural year, and results may not capture year-to-year variation in food security patterns tied to differing harvest outcomes, price conditions, or other shocks across multiple seasons. Extending this research design to a genuinely longitudinal multi-year framework would strengthen confidence in both the seasonal pattern and the farm-size-versus-diversification relationship documented here.

Conclusion

The main contribution of this research is direct evidence challenging the assumption that farming automatically confers food security, showing that among 240 surveyed farming households around Maseru, food security status correlated more strongly with income diversification and market access than with farm size, and that food security prevalence swung by nearly a factor of three across the seasonal cycle within this same population. Supporting evidence came from consistent diversification-related gaps within every farm size category and a dramatic seasonal decline in food security prevalence from the immediate post-harvest period to the pre-harvest lean season. For agricultural development and food security programming in this region, these findings support prioritizing income diversification and market access interventions alongside, rather than instead of, agricultural production support, and argue for food security assessment methodology that captures seasonal variation rather than relying on single-point cross-sectional snapshots that risk substantially understating a population's true food insecurity burden. Open questions remain around how these patterns hold across multiple agricultural years with differing production and price conditions, and whether specific income diversification or market access interventions can be shown to causally improve food security outcomes rather than the correlational relationship this cross-sectional research has documented.

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Contributions Not Qualifying for Authorship

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