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Household food insecurity level during food price inflation in south Ethiopia

Dibora Teferi Haile
National Taiwan Normal University
Tesfanesh Yohannes Tesfaye
Wolaita Sodo
Tsegaye Demissie Gemebo
Wolaita Sodo University
Yen-Jung Chang
yjchang2012@gmail.com
National Taiwan Normal University
Samson Kastro Dake
Wolaita Sodo University

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Abstract

Background

Food insecurity continues to be a serious public health concern, especially in urban areas where households depend heavily on the market for their food. In Ethiopia, rising food prices have made it increasingly difficult for many families to afford basic meals, yet evidence from secondary cities remains limited.

Objective

This study aimed to assess the level of household food insecurity and identify its contributing factors in Wolaita Sodo, southern Ethiopia, during a period of high food prices.

Methods

A community-based cross-sectional study was conducted among 506 urban households in Wolaita Sodo between October 15 and November 15, 2023. Participants were selected using a two-stage sampling technique. Data were collected via pretested, structured questionnaires and analyzed using RStudio. The level of food insecurity was determined using Household Food Insecurity Access Scale. Bivariable and multivariable binary logistic regression models were employed to identify significant predictors, with statistical significance set at $p < 0.05$.

Results

The prevalence of household food insecurity was remarkably high at 79.8% (95% CI: 76.1–83.1) among surveyed population, with 20.8% of households experiencing severe insecurity. Nearly 60% of respondents identified high food prices as the primary cause of food insecurity. Multivariable analysis revealed that households headed by individuals aged 45 to 64 years were more vulnerable to food insecurity than those headed by individuals under 44 years of age (AOR = 1.51, 95% CI: 1.01–2.27). In terms of house ownership, those in rented Kebele house (AOR = 2.16, 95% CI: 1.34–3.51) or rented private housing (AOR = 1.78, 95% CI: 1.16–2.74) faced higher risks of food insecurity than homeowners. Conversely, higher wealth status (AOR = 0.15, 95% CI: 0.09–0.26) and stable employment as a merchant (AOR = 0.27, 95% CI: 0.12–0.58) or NGO employee (AOR = 0.12, 95% CI: 0.04–0.35) served as protective factors.

Conclusion

The finding of this study revealed that food insecurity among urban households was considerably high. Addressing food insecurity requires multi-sectorial interventions that focus on expanding income-generating opportunities and improving urban housing affordability to build long-term household resilience.

Introduction

Food insecurity remains one of the most pressing global public health and development challenges of the twenty-first century [1, 2]. Approximately 2.4 billion people, representing nearly one-third of the global population, experienced moderate or severe food insecurity recently, with hundreds of millions continuing to face chronic hunger [3, 4].

While food insecurity is a global crisis, its burden is disproportionately concentrated in developing countries, where rates are twice the global average [1, 5, 6]. Sub-Saharan Africa remains the most severely affected region. In this region, structural challenges such as systemic poverty, rapid population growth, and political instability converge with environmental pressures to worsen nutritional vulnerability [7–9]. Within East Africa, the pooled prevalence of urban household food insecurity is alarmingly high, with documented rates ranging from 60% to 91% [6]. Recent meta-analytic evidence underscores the pervasive nature of household food insecurity in Ethiopia. Prevalence rates show significant heterogeneity, ranging from 21.7% to 79.10% with a pooled estimate of 51.46% [10].

Traditionally, food insecurity was viewed as a rural problem tied to agricultural cycles [11]. However, rapid urbanization in low- and middle-income nations has shifted this burden toward cities. Unlike rural families who may rely on subsistence farming, urban households exist in a state of near-total market dependency [4, 12, 13]. In Ethiopia, urban residents purchase the vast majority of their food and often spend more than three fourth of their total household income just to meet basic caloric needs [14–16]. This high level of expenditure renders these populations exceptionally vulnerable to market volatility.

The relationship between food price inflation and urban food security has reached a critical tipping point. In Ethiopia, persistent inflation, which exceeded 40% in 2023, has significantly eroded the purchasing power of the urban poor [15, 17].

The effects of widespread food insecurity in Ethiopia go far beyond short-term hunger, creating serious health and socioeconomic challenges. Among children, long-term lack of adequate nutrition has contributed to high rates of stunting, which can limit cognitive development and reduce future productivity[18, 19]. At the same time, many urban households rely on inexpensive, energy-dense but nutrient-poor foods, leading to a growing double burden of malnutrition, where child undernutrition coexists with obesity and diet-related diseases in adults [20–22]. As a result, these impacts not only affect individual well-being but also reinforce cycles of poverty and place increasing pressure on the country's health system and overall development [23, 24].

While the Ethiopian government has deployed strategic social protection frameworks, most notably the Urban Productive Safety Net Project (UPSNP) to bolster financial inclusion and human capital, persistent double-digit inflation continues to erode these hard-won developmental gains [25–28]. Despite multifaceted monetary and structural interventions aimed at price stabilization, inflationary pressures remain a dominant macroeconomic challenge for the urban poor [29]. Consequently, our empirical understanding of how these systemic drivers and safety net mechanisms actually protect families during acute price shocks remains both fragmented and inconsistent [25, 28].

Most existing research has focused on rural landscapes or major metropolitan centres, leaving secondary cities and rapidly growing urban hubs underexplored. In addition, findings on the factors associated with urban household food insecurity have been inconsistent across studies. Consequently, there is a critical gap in understanding how sustained high food prices reshape the socioeconomic determinants of health in these specific contexts. Therefore, this study aimed to assess the prevalence of household food insecurity and identify its associated factors in the context of high food prices in Wolaita Sodo town, Southern Ethiopia. By providing context-specific evidence, this research seeks to inform targeted interventions and support the development of resilient urban food systems in settings increasingly strained by market-related pressures.

Methods and Materials

Study design, period and area

A community-based cross-sectional study was conducted in Wolaita Sodo town from October 15 to November 15 2023. Wolaita Sodo is a vital urban center with nearly 50,000 households and a diverse economy supported by small-to-medium trade, government service, and non-governmental organizations. According to the town administration report of the 2014 Ethiopian calendar (Sodo City Administration, 2014), the city has recently faced significant demographic shifts due to continuous rural-urban migration and regional political instability. These pressures have created a unique context for studying food access in a rapidly growing urban environment[30].

Source population, inclusion, and exclusion criteria

Our study focused on urban households in Sodo, represented by either the household head or a spouse. To ensure participants had adequate knowledge of local food market trends, we included individuals who had resided in the study area for at least six months. We excluded households where the primary head was unable to communicate due to serious illness or mental health challenges, as the success of the interview depended on clear, retrospective reporting.

Sample size and sampling procedure

The sample size of 536 households was determined using a single population proportion formula via Epi Info 7. Our calculations were based on a 69.6% anticipated prevalence of food insecurity [31], a 5% margin of error, a 1.5 design effect, and a 10% non-response buffer.

We used a two-stage sampling technique. Out of 11 urban kebeles (lower administrative units) in the town, 4 kebeles were selected by lottery method. Then, the sample was allocated to the selected kebeles proportional to the household size in each kebele.. Finally, individual households were selected by using a systematic sampling technique.

Operationalization of variables

The core objective was to determine household food insecurity status, dichotomized as secure (0) or insecure (1). This was measured using the 9-item Household Food Insecurity Access Scale (HFIAS), a tool designed to distinguish food access experiences across diverse cultural settings. Households were assessed based on their experiences during the 30 days prior to the survey. Each item was scored from 0 (never) to 3 (frequently), resulting in a cumulative score between 0 and 27. Following the FANTA protocol, households were categorized into four tiers: food secure, mildly insecure, moderately insecure, and severely insecure[32]. We also collected data on household dietary diversity and utilized Principal Components Analysis (PCA) to construct a wealth index based on household assets and living conditions.

Data Collection Procedure and Quality Assurance

The questionnaire was initially prepared in English, translated into Amharic, and then back-translated into English by independent language experts to ensure consistency and accuracy. It included sections on socio-demographic and socio-economic characteristics, as well as the Household Food Insecurity Access Scale (HFIAS) adopted from the Food and Nutrition Technical Assistance (FANTA) project[32]. In addition, household dietary diversity information was collected using a structured, pretested, interviewer-administered questionnaire.

Data were collected through face-to-face interviews conducted by four trained degree-level data collectors, under the supervision of two senior researchers. To ensure high data quality, all data collectors received two days of intensive training, particularly on administering the HFIAS tool and handling sensitive questions professionally. The questionnaire was pretested on 5% of households outside the study area to identify and correct potential issues before the actual data collection. Furthermore, completed questionnaires were reviewed daily to ensure completeness, consistency, and accuracy throughout the data collection process.

Statistical Analysis

Data were cleaned and managed in EpiData 3.1 before being exported to RStudio for analysis. We used descriptive statistics to summarize the demographic profile of the participants. Bivariable logistic regression was used to identify potential candidates for the final model, using a p-value threshold of less than 0.25.

The final analysis utilized multivariable binary logistic regression to determine independent predictors of food insecurity. We reported the findings using Adjusted Odds Ratios (AOR) with 95% confidence intervals, considering p-values below 0.05 as statistically significant. To ensure the integrity of our results, we checked for multicollinearity, finding a mean Variance Inflation Factor (VIF) of 1.02 and confirmed the model's reliability using the Hosmer-Lemeshow goodness-of-fit test ($p = 0.522$).

Ethical Considerations

Ethical approval was obtained from the Ethical Review Committee of Wolaita Sodo University (Ref: CHSM/ERC/01/15), with additional permission from the Sodo Town Administrative Office and relevant kebele administrations. The study adhered to the principles of the Declaration of Helsinki.

Before data collection, participants were informed about the purpose of the study and what participation involved, and written informed consent was obtained from each household head. Participation was voluntary, and individuals could withdraw at any time without consequence. No personally identifying information was collected, and all data were kept confidential and used solely for research purposes.

Result

Socio-demographic and economic characteristics

A total of 506 households were included in the study, with a response rate of 94.4%. The mean age of the respondents was 48.8 (± 14.1) years, and the average number of household members was 4.93.

Most respondents were male (82.2%), and over half (56.3%) were aged 45–64 years and ≥ 65 years accounted for 14.2%. Regarding education, 24.7% had no formal education, while 34.0% had education above the secondary level. Government employees represented the largest occupational group (28.9%), followed by merchants (22.7%). Other participants were self-employed (13.4%), daily wage workers (13.6%), pensioners (9.9%), unemployed (7.1%), or NGO employees (4.4%). The majority of households (67.4%) had five or more members. Nearly half (46.9%) lived-in privately-owned houses, while 31.2% rented private housing and a smaller proportion lived in Kebele rental housing. (Table 1)

Table 1
Socio-demographic and economic characteristics of study participants, 2023 **(n = 506)**

Variable	Category	Frequency	Percentage
Sex of household head	Male	416	82.2
	Female	90	17.8
Age of household head	18–44	149	29.5
	45–64	285	56.3
	65+	72	14.2
Educational status of household head	No formal education	125	24.7
	Primary	96	19.0
	Secondary	113	22.3
	Above secondary	172	34.0
Occupation of household head	Unemployed	36	7.1
	Merchant	115	22.7
	Gov't employee	146	28.9
	NGO employee	22	4.4
	Self employed	68	13.4
	Daily wage	69	13.6
	Pension	50	9.9
Family size	< 5	165	32.6
	5+	341	67.4
House ownership	Privately owned	237	46.9
	Rented Kebele property	11	21.9
	Rented private property	158	31.2
Wealth index	Lower	156	30.8
	Middle	170	33.6
	Higher	180	35.6

Prevalence of household food insecurity

Overall, 79.8% of households were food insecure; 166 (32.8%) households were mildly food insecure, 133 (26.3%) were moderately food insecure, and 105 (20.8%) were severely food insecure. In addition, a

large majority of respondents (433, 85.5%) reported that they were unable to adequately feed their families, highlighting the widespread nature of the problem. Regarding the perceived causes of inadequate food consumption, high food prices were the most frequently reported factor (302, 59.7%), followed by reduced household income (19.2%), illness or loss of appetite (8.8%), and lack of time for food preparation (6.2%). (Fig. 1)

Household access to food, dietary diversity, and coping strategies

Most (96.0%) of the households purchased their food from the market, and 12(2.4%) and 2(0.4%) of households received remittance from any agent and their production, respectively. The monthly average expenditure of households was 4684.79-birr and the minimum household expenditure was 300 birrs with the range of 15000-birr expenditure.

The mean (+ SD) dietary diversity score of households was 5.9 ± 1.62. Then, based on this mean score household divide in tercile, 220 (43.5%) of households had consumed five or fewer food groups (poor dietary diversity) while 161(31.8%) had consumed seven or more food groups (high dietary diversity). Cereals (99.9%), sugar (93.6%), and miscellaneous foods like tea and coffee (96.4%) were the most commonly consumed food groups, whereas egg (12.5%), meat (6.7%), and fish (5.3%) were the least consumed food groups. (Fig. 2)

Regarding coping strategies, households used different strategies when faced with rising food prices and food insecurity, including shifting to less quality orcheap foods (49%), reducing non-food expenditure (27.7%), skipping meals (9.7%), and reducing the amount of meal (8.9%).

Factors associated with household food insecurity

In the multivariable logistic regression analysis, several socio-demographic and economic variables were found to be significantly associated with household food insecurity (Table 2). Households headed by individuals aged 45–64 years were associated with experiencing food insecurity compared to those aged 18–44 years [AOR = 1.51; 95% CI: 1.01–2.27]. Compared to unemployed household heads, those working as merchants [AOR = 0.27; 95% CI: 0.12–0.58], government employees [AOR = 0.46; 95% CI: 0.21–0.98], and NGO employees [AOR = 0.12; 95% CI: 0.04–0.35] were significantly associated with experiencing food insecurity. Households living in rented Kebele housing [AOR = 2.16; 95% CI: 1.34–3.51] and rented private housing [AOR = 1.78; 95% CI: 1.16–2.74] were associated with food insecure compared to those living in their own homes. Moreover, households in the middle [AOR = 0.44; 95% CI: 0.28–0.71] and highest [AOR = 0.15; 95% CI: 0.09–0.26] wealth categories had lower odds of experiencing food insecurity compared to those in the lowest wealth group.

Table 2
logistic regression analysis for factors associated with household food insecurity, 2023 (n = 506)

Variables	Categories	AOR (95% CI)	*p* Value
Age of household head	18–44	Ref	Ref
	45–64	1.51(1.01, 2.27)	*
	65+	0.75(0.40, 1.41)	
Occupation	Unemployed	Ref	Ref
	Merchant	0.27(0.12, 0.58)	*
	Government employee	0.46(0.21, 0.98)	*
	NGO employee	0.12(0.04, 0.35)	*
	Self-employed	0.45(0.20, 1.01)	
	Daily laborer	1.61(0.72, 3.58)	
	Pension	0.61(0.28, 1.34)	
Living house ownership	Private property	Ref	Ref
	Rented kebele property	2.16(1.34, 3.51)	*
	Rented private property	1.78(1.16, 2.74)	*
Wealth index	Lowest	Ref	Ref
	Middle	0.44(0.28, 0.71)	*
	Highest	0.15(0.09, 0.26)	*

***P < 0.05**

Discussion

This study reveals a stark and troubling level of household food insecurity in Wolaita Sodo, a rapidly growing city in South Ethiopia, during a time of economic strain. Nearly 80% of households were affected, with over one in five facing severe insecurity, and 85.5% of household heads reporting they could not adequately feed their families. These findings reflect both real deprivation and a widespread sense of hardship. The prevalence is higher than the 2022 national urban estimates, suggesting that food insecurity is worsening in secondary cities under the pressure of rising prices, heavy reliance on markets, and persistent poverty[6]

Although the observed prevalence falls within the higher end of previously reported estimates in Ethiopia (21.7%–79.1%), it is notably higher than findings from similar settings [10, 33, 34]. This increase likely

reflects the timing of the study, conducted during a period of sharp food price inflation exceeding 40% [15, 17]. Supporting this, nearly 60% of respondents identified rising food costs as the main barrier to accessing adequate food. In urban areas, where 96% of households depend on purchased food, this highlights strong market dependency which makes food security highly vulnerable to price changes and economic shocks [4, 12, 13]. Even modest increases in food prices can quickly limit household access.

This vulnerability is compounded by dietary patterns. While the mean dietary diversity score of 5.9 suggests moderate adequacy, it masks important nutritional gaps [35, 36]. Diets are largely dominated by inexpensive, energy-dense staples such as cereals and sugar, with limited intake of nutrient-rich foods like meat and eggs. This reflects “hidden hunger,” where caloric needs may be met but essential micronutrients are lacking [36–38]. In this context, the challenge is not only the quantity of food, but also its nutritional quality which is an important concern for public health. [14]

The association between household head age (45–64 years) and food insecurity highlights a demographic dimension that is often overlooked. This age group are economically active, yet simultaneously responsible for supporting both school-aged children and older family members. This is reflected in the higher proportion of larger households (67.4% with ≥ 5 members) within this group. In the Ethiopian context, such households face heightened dependency burdens, which amplify consumption needs without a corresponding increase in resources[5, 10, 39, 40]. Similar findings from other Ethiopian studies further emphasize the role of household head age and family structure in shaping food insecurity[10, 33].

Economic status emerged as a central protective factor. Households in higher wealth categories were significantly less likely to experience food insecurity, underscoring the importance of financial capacity in buffering against market shocks[4, 41]. This aligns with global evidence demonstrating that income remains one of the most consistent determinants of food security across diverse settings [6, 42].

Correspondingly, occupation of the household head further shapes vulnerability to food insecurity. Households led by individuals in stable jobs, such as merchants, government workers, or NGO employees, are less likely to be food insecure because they have more predictable incomes, especially during periods of economic uncertainty. In contrast, those relying on informal or unstable work, like daily labour, face a higher risk. Similarly, findings from other studies show that the stability and quality of employment are just as important as having a job, with precarious and low-paying work strongly linked to food insecurity[29, 43–46].

Housing conditions significantly influence food security. Households living in rented Kebele or private housing face a higher risk of food insecurity than those in owner-occupied homes, largely due to the financial strain of fixed rent. As living costs rise, food spending often becomes the most flexible expense, leading to reduced quantity and quality of diets. This highlights the close link between housing and food insecurity in urban areas and underscores the broader structural nature of the problem [47, 48].

Household coping strategies shed important light on these findings. As food prices rise, many families reduce meal size or skip meals to protect the most vulnerable, often relying on cheaper, lower-quality foods[14, 15]. These choices are more than short-term adjustments; they reflect ongoing stress with long-term impacts on health and well-being. In children, chronic undernutrition leads to stunting, limiting cognitive development and future productivity. At the same time, reliance on inexpensive, calorie-dense but nutrient-poor foods creates a “double burden” of malnutrition, where child undernutrition coexists with obesity and diet-related diseases in adults[18–22]. Notably, the high proportion of households reporting an inability to adequately feed their families, even among those with relatively higher educational attainment, suggests that food insecurity is no longer confined to traditionally vulnerable groups but is increasingly affecting broader segments of the urban population.

Conclusion

This study reveals a very high level of household food insecurity in Wolaita Sodo, highlighting the severe and escalating urban public health crisis in Ethiopia’s secondary cities. The findings show that food insecurity is strongly influenced by key factors, including the age of the household head, occupation, housing tenure, and household wealth status. Despite a seemingly moderate dietary diversity score, most households rely on low-cost, nutrient-poor foods, pointing to a widespread problem of hidden hunger. What is most striking is that food insecurity is breaking out of its traditional boundaries. It is no longer a struggle confined to the extreme poor, but a rising threat affecting a much broader segment of the urban population. This shift suggests that conventional aid is no longer enough. Instead, we need systemic changes that prioritize income security, affordable housing, and a stronger buffer against volatile food prices. If we are to secure the future of these rapidly expanding urban centers, food security must be treated as a core pillar of urban development and resilience.

Implications

From a policy perspective, these findings highlight the need for integrated, multisectoral responses. Addressing urban food insecurity in secondary cities requires not only stabilizing food prices and improving market access, but also strengthening income security, promoting stable employment opportunities, and addressing structural drivers such as housing affordability. Without such coordinated interventions, the current trajectory suggests a continued erosion of household resilience, with significant implications for public health and urban development.

Limitations

This study has some limitations that should be considered. First, the cross-sectional design makes it difficult to establish cause-and-effect relationships between the identified factors and food insecurity. Second, the use of self-reported data may introduce recall or reporting bias, particularly in relation to food consumption and coping behaviours. In addition, dietary diversity was measured using a 24-hour recall, which may not fully reflect usual eating patterns or seasonal changes. The study was also conducted in a single urban area, which may limit how far the findings can be generalized to other

settings. Finally, some important aspects, such as detailed income dynamics, food price variations over time, and deeper household experiences, were not fully explored. Future studies using longitudinal or mixed-method approaches would help provide a more complete understanding of urban food insecurity.

Declarations

The authors declare that they have no financial or personal relationships that could have influenced the findings or interpretation of this study.

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Author Contribution

D.T.H., T.Y.T. and Y.-J.C. developed the research idea and designed the study. D.T.H. and S.K.D. led the data collection and carried out the data analysis. T.Y.T. and T.D.G. supported the data collection process and supervised field activities. S.K.D. and Y.-J.C. provided overall guidance on the study design and methodology, and oversaw the research process. D.T.H. prepared the first draft of the manuscript. Y.-J.C., T.Y.T., T.D.G., and S.K.D. reviewed the manuscript critically and contributed to revisions. All authors read and approved the final version of the manuscript.

Data Availability

The data used and analyzed in this study can be obtained from the corresponding author upon reasonable request.

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Figures

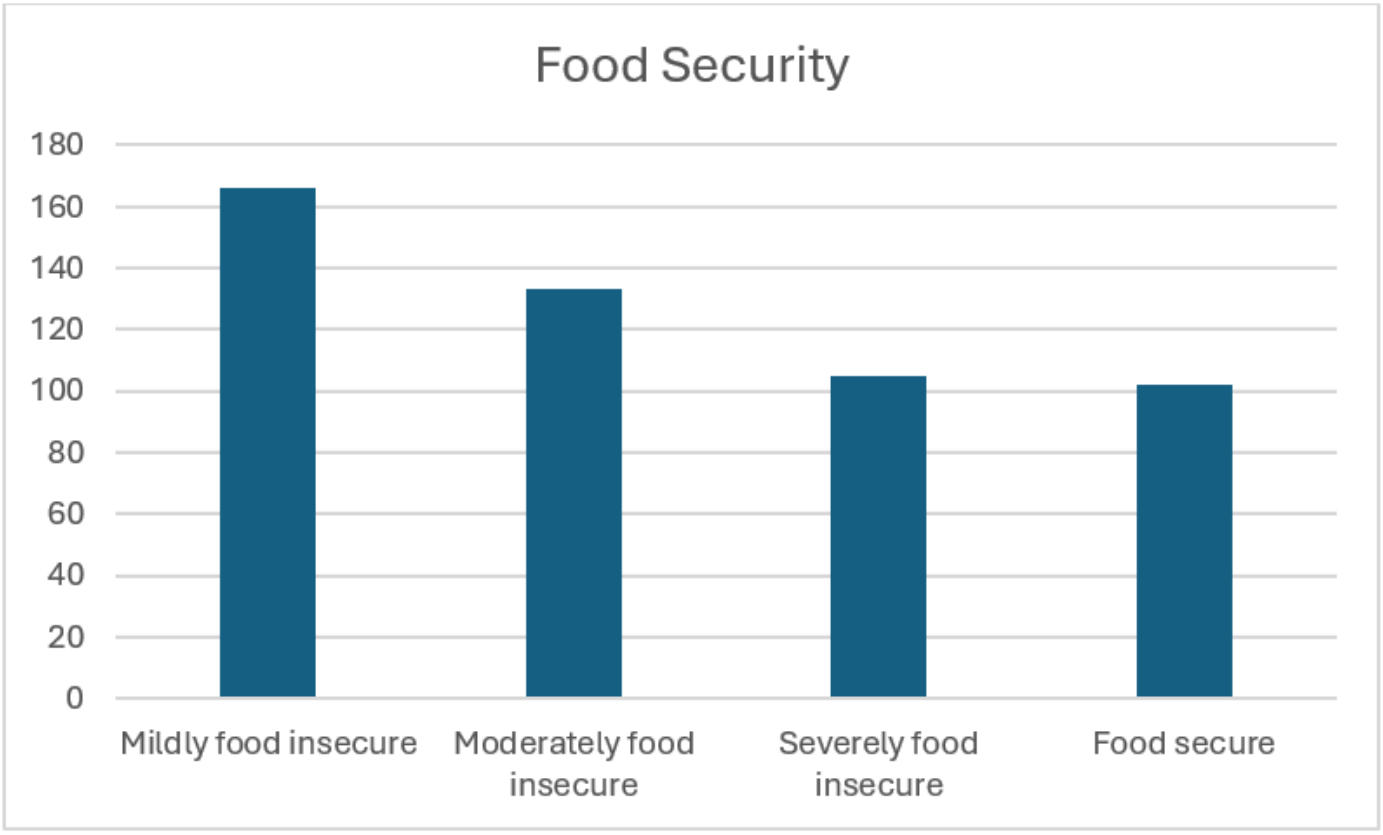


Figure 1

Household Food Insecurity Status in 2023

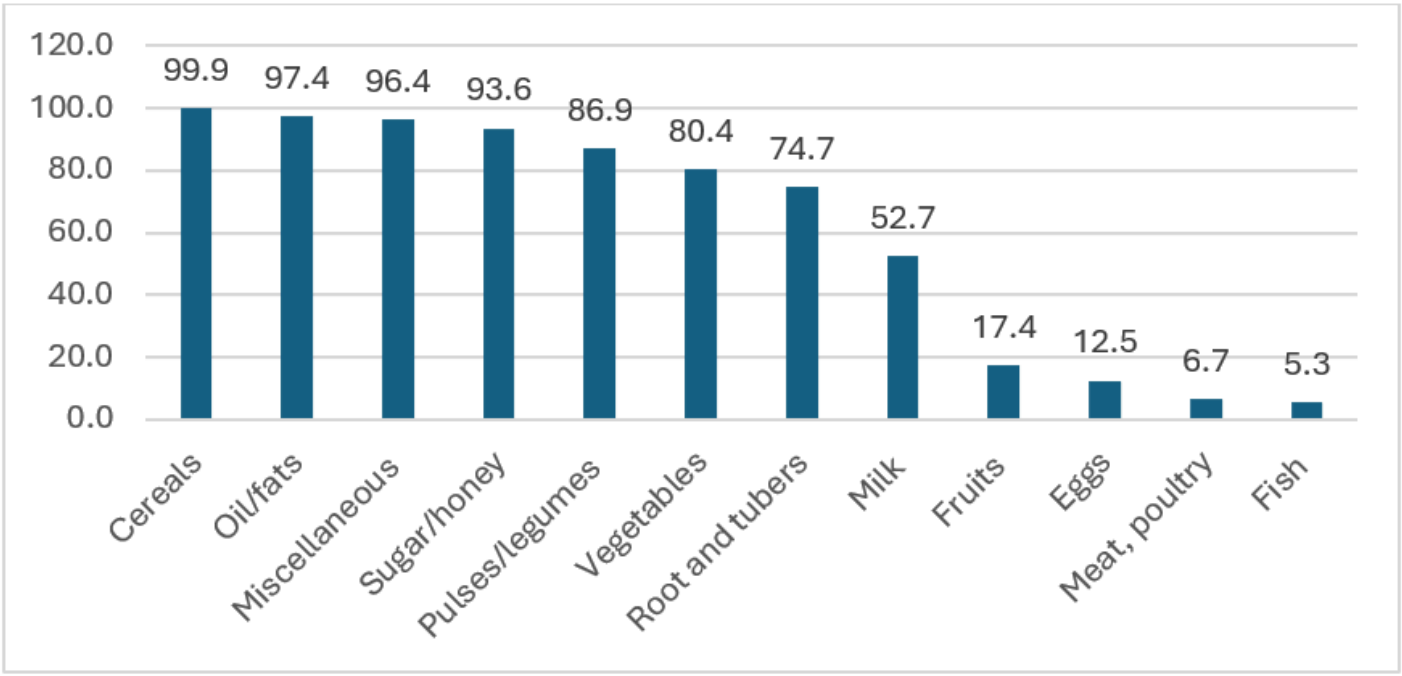


Figure 2

Household consumption from different food groups, 2023