Journal of Agriculture, Food Systems, and Community Development
ISSN: 2152-0801 online
https://foodsystemsjournal.org

Estimates of food insecurity among Cooperative Extension employees at a southeastern land-grant university

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Submitted December 2, 2025 / Revised March 16 and June 4, 2026 / Accepted June 4, 2026 / Published online September 9, 2026

Citation: Olayemi, V., Holmes, C., Hall, R., Serrano, E., Harden, S. M., & Misyak, S. (2026). Estimates of food insecurity among Cooperative Extension employees at a southeastern land-grant university. *Journal of Agriculture, Food Systems, and Community Development*, *15*(4), 187–200. https://doi.org/10.5304/jafscd.2026.154.026

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Abstract

Food insecurity among public health professionals is an underexplored issue with implications for workforce well-being and program delivery. Although Cooperative Extension (CE), the applied outreach arm of land-grant universities, plays a critical role in advancing food systems and community health, little is yet known about the food security status of CE employees themselves. This study examined the prevalence and predictors of food insecurity among CE employees at a southeastern land-grant university using data from a 2024 cross-sectional survey (N = 95; 12% response rate). Food security was assessed using the USDA Household Food Security Module. Logistic regression models were used to evaluate the associations between food insecurity and sociodemographic, work-related, and financial resilience (absorptive capacity) variables. Over one in five respondents (22.1%) reported experiencing food insecurity. Higher absorptive capacity (AOR = 0.02, 95% CI: 0.0006-0.16) and educational attainment (AOR = 0.44, 95% CI: 0.17-0.92) were significantly associated with lower odds of food insecurity, while income and job classification were not. Food insecurity was significantly linked to self-reported poor

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physical and mental health ($p < 0.05$), and 23% of respondents reported using at least one nutrition assistance program. These findings revealed that economic vulnerability exists within a key public health workforce, and underscore the need for institutional policies that support employee financial resilience and food access. By addressing food insecurity among CE employees, both workforce wellness and the effectiveness of community-based programming may be enhanced.

Keywords
food insecurity, nutrition security, Cooperative Extension, land-grant university, public health workforce, absorptive capacity, employee wellness, workforce vulnerability

Introduction

Food insecurity, defined by the U.S. Department of Agriculture (USDA) as the lack of consistent access to enough food for an "active, healthy life" (USDA Economic Research Service [USDA ERS], 2026), continues to be a significant public health issue in the U.S. (Anderson, 1990). In 2023, about 18 million (13.5%) of the U.S. population experienced food insecurity (Rabbitt et al., 2024). Food insecurity is associated with numerous adverse physical and mental health outcomes, including increased risk of chronic diseases, lower overall health, impaired childhood development, higher rates of depression and anxiety, and diminished economic productivity (Gundersen & Ziliak, 2015; Gundersen et al., 2011; Jones, 2017; Martin et al., 2016; Seligman et al., 2010). Recently, the concept of nutrition security, the "consistent access, availability, and affordability of foods and beverages that promote well-being, prevent disease, and if needed, treat disease" (Mozaffarian et al., 2021, p. 1605), has gained prominence in the U.S. Nutrition security builds on food security, emphasizing the coexistence of food insecurity and diet-related diseases.

Nutrition security and food access are a strong emphasis of the work of Cooperative Extension (CE), the applied outreach arm of land-grant universities. The Morrill Acts of 1862 and 1890 established the U.S. system of land-grant universities, institutions to "democratize" higher education and address societal needs via research, teaching, and community engagement (Association of Public & Land-Grant Universities [APLU], 2025). CE delivers science-based education and locally relevant programs on topics spanning agriculture, food production, community development, disaster assistance, digital and technology literacy, 4-H youth development, and food access and health promotion that advance public health and well-being. These initiatives are accomplished through a coordinated network and partnership between on-campus administrators, disciplinary faculty ("specialists"), county-based educators ("extension agents," typically classified as administrative/professional faculty), and support staff who provide administrative and programming support.

CE's national framework designates food security as a key social determinant of health and well-being (Burton et al., 2021). Research, educational programs, and partnerships with schools, farms, and community organizations allow CE personnel to implement youth gardening, farm-to-school initiatives, nutrition education classes, and health promotion campaigns that contribute to food and nutrition security (Burton et al., 2021; Cuite & Errickson, 2022; Lin et al., 2024; Olayemi et al., 2025; Schonberger et al., 2022; Sowerwine et al., 2019)). The 2024 National Cooperative Extension's Health and Well-Being Infrastructure Survey indicated that about 4,200 CE employees were dedicated to delivering health and well-being programming, for their communities and across responding institutions, with food security identified as an inte-

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Author Note
This manuscript represents a portion of a doctoral dissertation by the first author (in preparation).

gral component of this work (Center for Community Health and Evaluation, 2024).

Despite these contributions, the food security status of CE employees themselves has not been previously explored and it is not clear how food security presents itself within CE.
This represents a significant knowledge gap given the broader evidence that employment does not necessarily confer protection against food insecurity. Nationally, more than half of households experiencing food insecurity include at least one working adult (Rabbitt et al., 2024).
If those tasked with promoting food security are themselves at risk, the resulting stresses may undermine their personal well-being, ultimately manifesting as poorer mental and physical health (Martin et al., 2016). These stresses may also undermine the effectiveness of their outreach initiatives (Jones, 2017; Liebe et al., 2024). Furthermore, household financial resilience (absorptive capacity) has emerged in the literature as a critical predictor of food security, independent of income level (Ansah et al., 2019; Calloway et al., 2022; Calloway et al., n.d.; d'Errico et al., 2018; Smith & Frankenberger, 2018). Absorptive capacity is a household's ability to withstand short-term financial shocks such as unexpected expenses or job loss using quickly accessible resources. Understanding its contribution alongside traditional demographic and employment factors could provide insights into potential intervention targets for workforce stability.

The purpose of this study was to examine the prevalence of food insecurity among CE employees at a southeastern land-grant university founded in 1872 and to identify sociodemographic and work-related factors associated with food insecurity, including income, household financial resilience/absorptive capacity, job classification, and work location. Given the role that CE plays in promoting food systems, food access, and food security, understanding employee's personal experiences with food security is important for informing organizational practices and policy.

Literature Review

National data show that employment does not fully protect households from food insecurity: more than half of food-insecure households include at least one working adult (Rabbitt et al., 2024). Household financial resilience, often conceptualized as absorptive capacity, has emerged as a critical predictor of food security beyond income alone. Absorptive capacity reflects a household's ability to manage short-term financial shocks through liquid assets, manageable expense burdens, and stable housing (Calloway et al., 2022). Prior research indicates that households with higher absorptive capacity are less likely to experience food insecurity, even at similar income levels, suggesting that resilience to income volatility and unexpected costs can be as important as income in determining food security status (Ansah et al., 2019; Calloway et al., 2022; d'Errico et al., 2018; Smith & Frankenberger, 2018).

Educational attainment has also been associated with lower risk of food insecurity. Higher levels of education may increase earning potential, but they may also improve awareness of available resources, strengthen problem-solving skills, and facilitate network-building, all of which can buffer against economic shocks and food hardship (Gundersen & Ziliak, 2015; Smith & Frankenberger, 2018). Together, financial resilience and education may shape households' ability to navigate economic constraints and maintain food security.

Research on specific occupational groups has documented substantial variability, however, in food insecurity prevalence. For example, 27% of employees at an urban worksite experienced food insecurity (Feuerstein-Simon et al., 2019), while studies of early care and education workers found prevalence ranging from 21% to 41% (Loh et al., 2020; Swindle et al., 2018; Swindle et al., 2021). By contrast, studies among healthcare workers have reported lower rates, in the range of 6–7% (Srinivasan et al., 2021). These findings highlight that food insecurity can affect a wide range of essential workers, including those in health and education sectors. In higher education, an emerging body of research has examined food insecurity among students, with comparatively fewer studies focused on university staff and faculty. However, available evidence suggests that university employees can also experience food insecurity, with reported prevalence in some staff cohorts compa-

rable to or exceeding national averages (Coca et al., 2020; Dreier et al., 2016; Kent et al., 2022; Riddle et al., 2020). These studies underscore that universities are not immune to workforce food insecurity, even when they host food and nutrition programs and services aimed at students and community members.

Despite the robust literature on food insecurity among various workforces and the growing emphasis on nutrition security and financial resilience, little is known about how these dynamics operate within land-grant universities themselves, particularly in CE workforces whose mission centers on advancing food and nutrition security in communities. This study addresses that gap by examining food insecurity, financial resilience, and associated factors within CE employees at one land-grant university.

Methods

This analysis draws on data from a 2024 cross-sectional survey of food access and well-being among employees at a southeastern land-grant university to explore specific research questions related to food security, health, and financial resilience within the university's CE workforce.

Respondents

Approximately 800 CE employees at the university (including county-based extension agents, campus-based specialists, and CE support staff) were eligible for this study. The study was approved by the Institutional Review Board (IRB: 24-067). Recruitment efforts primarily targeted non–tenure-track university employees through relevant employee listservs and flyers to maximize participation. Although tenure-track faculty were eligible for this secondary analysis, the recruitment strategy limited their representation in the study, resulting in only a small number of tenure-track respondents. The survey was administered online using Qualtrics. Eligible respondents were staff and faculty members within CE aged 18 and older (tenure track faculty, non-tenure track faculty, classified and university staff). Student employees and individuals who did not meet these criteria were excluded from the study. Data collection occurred between February and May 2024. All responses were anonymized and securely stored in accordance with IRB requirements.

Measures

Sociodemographic Information. Respondents provided information on age, sex, race, ethnicity, number of children in the household, household income, participation in nutrition assistance programs, college of employment, job classification, educational attainment, and job location. Variables were collected as categorical or continuous, as appropriate; for example, age and income were collected as continuous variables, while sex and job classification were collected as categorical variables.

Food Security. Food security status was measured using the USDA Household Food Security Survey Module (Bickel et al., 2000). Households with children completed the 18-item version, and those without children completed the 10-item adult version. Each item was coded as affirmative (1) or negative (0). For households with children, scores ranged from 0 to 18, categorized as high food security (0), marginal food security (1–2), low food security (3–7), and very low food security (8–18). For households without children, scores ranged from 0 to 10, with categories of high (0), marginal (1–2), low (3–5), and very low food security (6–10). The recall period was the past 12 months (Bickel et al., 2000; USDA ERS, 2012). Missing or ambiguous responses were treated as missing data and excluded from scoring.

Physical and Mental Health. Physical and mental health were each assessed using a single-item question: "How would you rate your overall physical health?" and "How would you rate your overall mental health?" Responses were recorded on a 5-point Likert scale from 1 (terrible) to 5 (excellent). No specific timeframe was indicated. These single-item measures were chosen to minimize respondent burden and have been used as proxies for more comprehensive scales in prior research, although their limitations are acknowledged (Allen et al., 2022).

Absorptive Capacity. Household financial resilience (absorptive capacity) was measured using a vali-

dated 9-item Household Financial Resilience Scale (Calloway et al., 2022). This tool assesses short-term coping capacity for financial shocks, such as income disruption or unplanned expenses, based on liquid assets, expense burden, and housing stability. Final scores ranged 0–3, with higher values indicating greater financial resilience.

Data Analysis

Descriptive statistics (means, standard deviation, frequencies, and percentages) were used to summarize the demographic characteristics and work-related factors generated by respondents. Association between food insecurity and mental/physical health were tested with Fisher's exact test, and logistic regression analyses examined the relationship between sociodemographic and work-related factors and food security status in two models. Model 1 focused on demographic characteristics and absorptive capacity, and Model 2 included additional work-related factors. For the logistic regression, part-time faculty ($n = 3$) and tenure-track faculty ($n = 3$) were excluded because extremely small subgroup sizes can produce unstable coefficient estimates and compromise model reliability (Peduzzi et al., 1996). The two-model rationale was to isolate sociodemographic versus occupational effects. All analyses were performed using R version 4.4.1 (R Core Team, Vienna, Austria), and models were fit using the GLM package (Touchon, 2021). Statistical significance was set a priori at $p < 0.05$.

Results

A total of 95 respondents met the inclusion criteria for this analysis for a response rate of approximately 12%. Over three-quarters (86.3%) were female. The mean age was 42.1 years (SD ± 11.6). The average number of years that respondents had worked at the university was 10.3 years (SD ± 9.8). Of the respondents, 42 (44.2%) were administrative and professional faculty and about half ($n = 47$, 49.5%) held a postgraduate degree. Notably, 22 (23.2%) of the total respondents participated in at least one nutrition assistance program. Additional sociodemographic characteristics are summarized in Table 1.

Table 1. Sociodemographic and Employment Characteristics of Cooperative Extension Employees at a Southeastern Land-Grant University ($N = 95$)

Characteristics	*n* (%) or mean ± SD
Age (years)	42.1 ± 11.6
Years at Institution	10.3 ± 9.8
Absorptive Capacity	2.0 ± 0.6
Household Size	2.4 ± 1.0
Employee respondent type	
Administrative/Professional (AP) Faculty	42 (44.2)
Teaching and Research Faculty	14 (14.7)
Part-Time Faculty	3 (3.2)
Classified Staff	12 (12.6)
University Staff	21 (22.1)
Tenure-Track Faculty	3 (3.2)
Race	
Black or African American	10 (10.5)
White	82 (86.3)
Other race [a]	3 (3.2)
Ethnicity	
Hispanic	3 (3.2)
Non-Hispanic	89 (93.7)
Not sure	3 (3.2)
Sex	
Male	13 (13.7)
Female	82 (86.3)
Education Attainment	
High school or GED or less than a high school diploma	14 (14.7)
Some college	7 (7.4)
Associate	9 (9.5)
Bachelor	18 (18.9)
Postgraduate	47 (49.5)
Marital Status	
Married	56 (58.9)
Divorced /Separated/Widowed	13 (13.7)
Never Married	26 (27.4)
Job Status/Location	
On-campus	15 (15.8)
Off-campus, not at home	67 (70.5)
Off-campus, at home	3 (3.2)
Hybrid	10 (10.5)
Number of Children in the Household	
0	65 (68.4)
1	16 (16.8)
2	11 (11.6)
3+	3 (3.2)

continued

continued

Assistance Program Participation (select all that apply)	
One or more programs[2]	36 (32.9)
None	73 (67.0)
Persons Living in the Household (select all that apply)	
Live alone	16 (12.6)
Child/children under 5 years old	12 (9.5)
Child/Children 5 years or older	29 (22.8)
Spouse	53 (41.7)
Unmarried Partner	12 (9.5)
Parent or Grandparent	4 (3.2)
Other	1 (0.8)
Monthly Household Income ($)	
<2,000	8 (8.4)
2,000–4,000	28 (29.5)
4,000 –6,000	20 (21.0)
6,001–8,000	18 (18.9)
>8,001	21 (22.1)

[a] American Indian or Alaska Native; Asian. [2]Child Health Insurance Program; National School Lunch Program/School Breakfast Program; Supplemental Nutrition Assistance Program; Supplemental Nutrition Assistance Program Education/ Expanded Food and Nutrition Education Program; Temporary Assistance for Needy Families; Food banks; Head Start; Medicaid; Public Housing; Unemployment Insurance

Food Security Status

Based on the USDA Household Food Security Survey Model, 22.1% (n = 21) of respondents experienced food insecurity in the past year. Specifically, 54.7% (n = 52) reported high food security, 23.2% (n = 22) marginal, 9.5% (n = 9) low, and 12.6% (n = 12) very low food security.

Food insecurity was more prevalent among respondents reporting poor mental and physical health. Among those rating their mental health as "poor," 66.7% experienced food insecurity, compared to 16.7% among those rating their mental health as "excellent." Similar trends were observed for physical health (Figure 1). There was a significant association between reported food security status and self-rated mental health ($p < 0.05$) and self-rated physical health ($p < 0.05$). Specifically, respondents experiencing food insecurity were more likely to report poorer mental and physical health (poor or terrible) compared to food secure respondents, who more frequently reported excellent to average mental and physical health.

Table 2 summarizes the logistic regression tests. In the first model, which controlled for soci-

Figure 1. Food Insecurity by Self-Reported Health Among Cooperative Extension Employees at a Southeastern Land-grant University

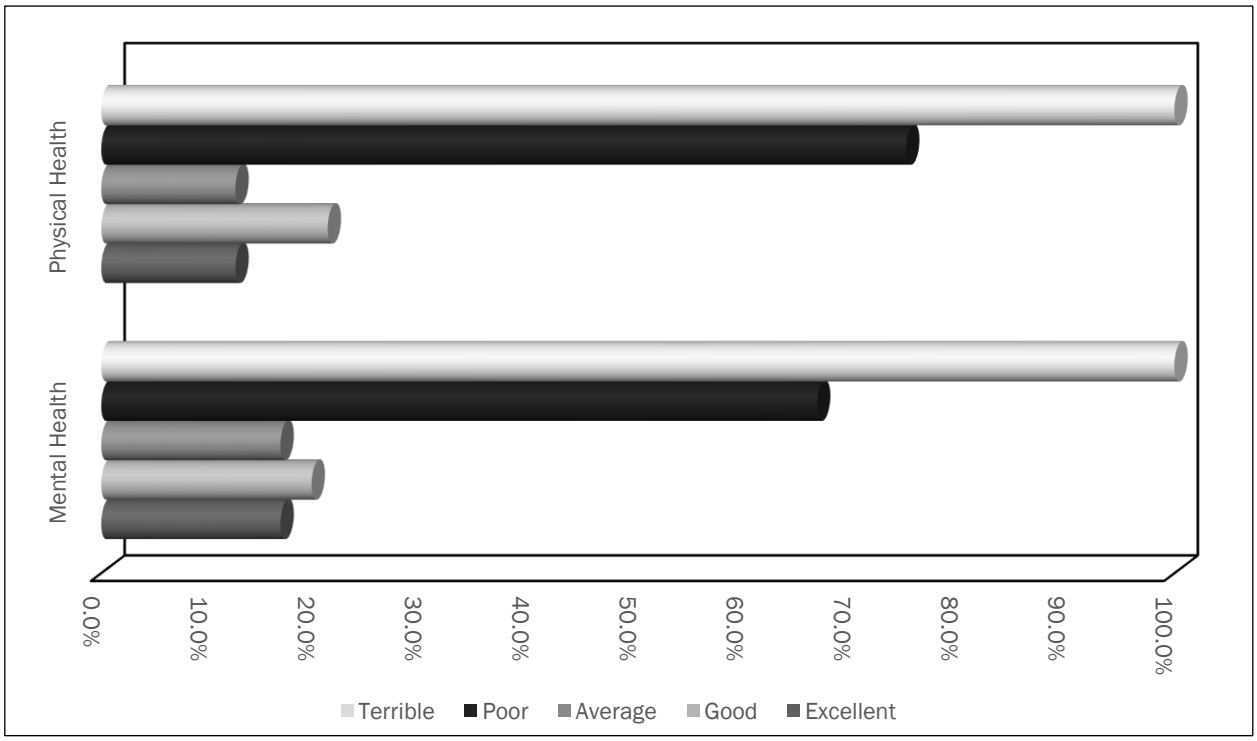


Table 2. Logistic Regression Models: Predictors of Food Insecurity Among Cooperative Extension Employees at a Southeastern Land-Grant University

Predictor	Model 1 AOR (95% CI)	*p*-value	Model 2 AOR (95% CI)	*p*-value
Age (in years)	0.97 (0.90-1.03)	0.32	1.04 (0.94-1.16)	0.48
Race	0.88 (0.39-2.19)	0.76	0.85 (0.30-2.86)	0.77
Ethnicity	3.31 (0.32-89.5)	0.38	20.70 (0.41-11900)	0.21
Highest Grade Completed	0.61 (0.35-1.02)	0.07	**0.44 (0.17-0.92)**	**<0.05**
Sex	0.52 (0.07-3.96)	0.51	0.81 (0.05-12.6)	0.87
Children in the Household	0.72 (0.11-5.30)	0.73	0.35 (0.03-3.32)	0.34
Marital Status	1.37 (0.48-4.30)	0.56	2.12 (0.66-8.27)	0.23
Absorptive Capacity	**0.04 (0.004-0.22)**	**<0.01**	**0.02 (0.0006-0.16)**	**<0.01**
Income: $2,000–$4,000	0.24 (0.01-3.38)	0.32	0.17 (0.003-2.89)	0.27
Income: $4,001–$6,000	0.52 (0.02-7.96)	0.65	1.02 (0.03-23.50)	0.99
Income: $6,001–$8,000	0.06 (0.001-1.85)	0.15	0.07 (0.0001-7.44)	0.31
Income: >$8,001	0.86 (0.04-17.1)	0.92	1.32 (0.02-54.90)	0.88
Does Not Participate in Any Assistance Program	0.67 (0.12-3.90)	0.64	1.85 (0.18-30.10)	0.62
Job Location (on campus, off campus at home, off campus not home, hybrid)	—	—	0.76 (0.13-3.62)	0.75
Years at institution	—	—	0.87 (0.71-1.02)	0.11
Job Classification	—	—	0.66 (0.31-1.24)	0.22

AOR = Adjusted Odds Ratio. CI = Confidence Interval; $P < 0.05$ is considered statistically significant.

odemographic factors, higher absorptive capacity was significantly associated with lower odds of food insecurity (AOR = 0.04, 95% CI: 0.004-0.22, $p < 0.01$).).In the second model, which controlled for both sociodemographic and work-related factors, higher absorptive capacity (AOR = 0.02, 95% CI: 0.0006-0.16, $p < 0.01$) and higher education attainment (AOR = 0.44, 95% CI: 0.17-0.92, $p < 0.05$) were significantly associated with reduced odds of food insecurity. Income was not a significant predictor after adjustment, nor were job classification or work location.

Discussion

This study provides one of the first assessments of food insecurity among CE employees at major U.S. land-grant universities, and revealed that more than one in five (22.1%) CE employees surveyed experienced food insecurity. Although this prevalence exceeds national averages (Rabbitt et al., 2024), it should be interpreted as reflecting conditions within a single institution rather than the CE workforce as a whole. Nonetheless, the findings parallel trends in other university staff cohorts (Coca et al., 2020; Dreier et al., 2016; Kent et al., 2022; Riddle et al., 2020). This is especially notable considering that 23.2% of the respondents reported using at least one form of nutrition assistance program. The high prevalence among CE employees underscores that individuals employed by an organization whose aim is to support agriculture, food production, food access, and health nevertheless are also vulnerable to food insecurity and household financial shocks.

The adjusted regression analysis revealed both higher absorptive capacity (financial resilience) and educational attainment as protective for food security. The significance of household financial resili-

ence is consistent with the literature, as respondents with higher absorptive capacity have greater ability to meet financial shocks and household expenses, which leads to consistently and significantly lower odds of experiencing food insecurity (Calloway et al., 2022). This finding aligns with broader research showing that, even among working adults, financial and household resilience may contribute to greater household food security by mitigating the effects of income volatility on food security status (Ansah et al., 2019; Calloway et al., 2022; d'Errico et al., 2018; Liebe et al., 2023; Smith & Frankenberger, 2018).

The protective effect associated with educational attainment suggests that, beyond income, education may support food security through increased access to information, resource navigation skills, and professional networks (Gundersen & Ziliak, 2015; Smith & Frankenberger, 2018). That income was not statistically significant after adjustment may reflect both the relatively narrow income range in this sample and interaction effects.

Work-related variables and sociodemographic factors (work location, years of employment, sex, marital status, and race/ethnicity) were not statistically significant predictors in the fully adjusted model, apart from absorptive capacity and educational attainment. Job classification was also found not to be significantly associated with food security. It is important to note that almost a quarter of administrative and professional faculty, who would include county-level extension agents, and 33.3% of classified staff and 23.8% of university staff, reported being food insecure (Appendix, Table A1). These findings suggest that financial vulnerability may cut across professional boundaries among CE employees, emphasizing the need for broad interventions rather than focusing interventions only on specific job types or demographic groups. Additional sociodemographic patterns related to food security are detailed in Appendix Tables A2–A5.

Notably, food insecurity was strongly associated with both poor physical and mental health status. Respondents rating their physical or mental health as "poor" or "terrible" were substantially more likely to experience food insecurity, reflecting the established literature which documents bidirectional relationships between food security and health outcomes (Gundersen & Ziliak, 2015; Gundersen et al., 2011; Maynard et al., 2018). This relationship indicates that supporting food security among employees may yield downstream benefits in workforce wellness and productivity.

Although participation in nutrition assistance program was relatively low in this sample, the prevalence of food insecurity was substantial. This pattern is consistent with prior work demonstrating elevated rates of food insecurity among populations whose incomes are above program thresholds or whose circumstances make them functionally ineligible for assistance, even when they experience material hardship (Furness et al., 2004; Keith-Jennings et al., 2019). Low assistance program participation among the respondents therefore does not necessarily indicate mild or transient food hardship; rather, it may reflect structural and categorical barriers to program access. Many vulnerable adults, particularly those without dependent children, are subject to strict time limits and may receive only three months of SNAP benefits in a 36-month period, even when their financial situation remains precarious (Keith-Jennings et al., 2019). This suggests that the underutilization of nutrition assistance program in this sample may be at least partly structurally driven, rather than evidence of limited need.

This study is not without limitations, including that it is a cross-sectional study, which discourages causal inference. The sample is from a single university system, limiting generalizability, though the pattern aligns with emerging data from other higher education settings cohorts (Coca et al., 2020; Dreier et al., 2016; Kent et al., 2022; Riddle et al., 2020). The reliance on self-reported metrics may also introduce reporting bias. Selection bias is another limitation that might have affected the estimates from this study, as potential respondents who were experiencing food insecurity may have been either more or less likely to participate. Also, the recruitment strategy of the original research limited the number of eligible tenure-track positions included in this current study; this low representation may also explain the higher prevalence of food insecurity observed in our sample, as tenure-track positions tend to have higher salaries com-

pared to non-tenure-track faculty and staff. Several contextual factors may help explain the elevated prevalence observed in this sample, such as regional cost-of-living and salary structures that differ across job classifications among others. These considerations suggest caution in extrapolating the findings to the broader CE workforce. Despite these limitations, the results offer robust, actionable insights given the use of validated measures.

Conclusions

This study reveals a high prevalence of food insecurity among CE employees at a southeastern land-grant university, exceeding both national averages and estimates among other U.S. university personnel. The pivotal role of household absorptive capacity highlights financial resilience as the linchpin of food security among working adults, including those in educational and outreach settings. These findings highlight that the professionals tasked with promoting food security and nutrition security in communities may themselves actually experience economic vulnerability, an issue with implications for both employee health and program effectiveness.

Future research should build upon these preliminary findings using longitudinal and mixed method designs to examine how changes in income, benefits, and absorptive capacity influence financial resilience and food security trajectories over time. A multi-year cohort study across several land-grant universities could help identify systemic and regional factors affecting workforce food security. Complementary qualitative inquiry, such as focus groups and interviews, could deepen understanding of employees lived experiences, coping mechanisms, and perceptions of organizational support in order to guide institutional responses. In parallel, implementation studies are also needed that would test workplace-based interventions, such as emergency food pantries, financial literacy and budgeting programs, institutional hardship funds, and annual employee cost-of-living salary adjustments to determine their effectiveness in improving food security outcomes. By embedding such efforts into institutional wellness and human resource strategies, CE systems can better align their internal practices with their external commitments to equity and community health

CE systems and university administrators can act on these findings by embedding workforce food security efforts into institutional wellness and human resources initiatives. This could include formalizing a workforce food security policy that defines the institution's commitment to employee well-being, establishing internal hardship funds or grocery-subsidy programs, and forging partnerships with the community to expand staff resources. Practical models from higher-education settings are already emerging: a few universities have launched employee-focused pantries to directly address staff and faculty food access challenges (Haughey, 2024; University of Washington, 2026). By adapting and evaluating such interventions, CE systems can model holistic, equity-driven approaches to food security, not only for the communities but for the employees.

Addressing food insecurity among CE employees is not merely a matter of employee support; it is vital to the integrity and sustainability of CE and the land-grant university mission. Empowering the workforce with greater financial resilience and food access strengthens the foundation of Extension outreach and public health practice. As institutions navigate evolving socioeconomic contexts and workforce needs, integrating employee food security into broader wellness and operational strategies can help ensure that those who lead food security and community health initiatives are themselves supported and thriving.



References

Allen, M. S., Iliescu, D., & Greiff, S. (2022). Single item measures in psychological science: A call to action. *European Journal of Psychological Assessment*, *38*(1), 1–5. https://doi.org/10.1027/1015-5759/a000699

Anderson, S. A. (1990). Core indicators of nutritional state for difficult-to-sample populations. *Journal of Nutrition*, *120*(Suppl. 11), 1555–1598. https://doi.org/10.1093/jn/120.suppl_11.1555

Ansah, I. G. K., Gardebroek, C., & Ihle, R. (2019). Resilience and household food security: A review of concepts, methodological approaches and empirical evidence. *Food Security*, *11*(6), 1187–1203. https://doi.org/10.1007/s12571-019-00968-1

Association of Public & Land-Grant Universities [APLU]. (2025). *Land-grant university FAQ: What is a land-grant university?* https://www.aplu.org/about-us/history-of-aplu/what-is-a-land-grant-university/

Bickel, G., Nord, M., Price, C., Hamilton, W., & Cook, J. (2000). *Guide to measuring household food security*. U.S. Department of Agriculture, Food and Nutrition Administration. https://www.fns.usda.gov/research/guide-measuring-household-food-security-revised-2000

Burton, D., Canto, A., Coon, T., Eschbach, C., Gutter, M., Jones, M., Kennedy, L., Martin, K., Mitchell, A., O'Neal, L., Rennekamp, R., Rodgers, M., Stluka, S., Trautman, K., Yelland, E., & York, D. (2021) *Cooperative Extension's national framework for health equity and well-being. Report of the Health Innovation Task Force*. Extension Committee on Organization and Policy Health Innovation Task Force. https://www.aplu.org/wp-content/uploads/202120EquityHealth20Full.pdf

Calloway, E. E., Carpenter, L. R., Gargano, T., Sharp, J. L., & Yaroch, A. L. (2022). Development of three new multidimensional measures to assess household food insecurity resilience in the United States. *Frontiers in Public Health*, *10*, Article 1048501. https://doi.org/10.3389/fpubh.2022.1048501

Calloway, E., Carpenter, L., Gargano, T., Sharp, J., & Yaroch, A. (n.d.). *Measures to assess household resilience: Absorptive capacity, adaptive capacity, and transformative capacity. Scoring and interpretation guide.* The Gretchen Swanson Center for Nutrition. https://static1.squarespace.com/static/58a4dda16a49633eac5e02a1/t/65c4055134cea3338a6d5c4f/1707345238897/Resilience+User+Guide_2024.pdf

Center for Community Health and Evaluation. (2024). *Cooperative Extension's health and well-being infrastructure survey. Results from the 2024 National Survey*. https://health.extension.org/wp-content/uploads/2025/05/WCC_CES-Infrastructure-survey-report_2024-survey_FINAL_2025.05.09.pdf

Coca, V., Kienzl, G., Goldrick-Rab, S., & Richardson, B. (2020). *Basic needs insecurity in the higher education instructional workforce*. The Hope Center for College, Community, and Justice. https://www.luminafoundation.org/wp-content/uploads/2020/12/basic-needs-insecurity-in-the-higher-education-instructional-workforce.pdf

Cuite, C. L., & Errickson, L. B. (2022). Strengthening urban food systems through extension programming and community engagement: A case study of New Brunswick, New Jersey. *Journal of Human Sciences and Extension*, *10*(2), Article 5. https://doi.org/10.54718/INUX6753

d'Errico, M., Grazioli, F., & Pietrelli, R. (2018). Cross-country evidence of the relationship between resilience and the subjective perception of well-being and social inclusion: Evidence from the regions of Matam (Senegal) and the Triangle of Hope (Mauritania). *Journal of International Development*, *30*(8), 1339–1368. https://doi.org/10.1002/jid.3335

Dreier, P., Bomba, M., & Romero, R. (2016). *Food insecurity among University of California employees.* Urban & Environmental Policy Institute, Occidental College. https://aper.assembly.ca.gov/sites/aper.assembly.ca.gov/files/Food%20Insecurity%20Report.pdf

Feuerstein-Simon, R., Dupuis, R., Schumacher, R., & Cannuscio, C. C. (2019). A randomized trial to encourage healthy eating through workplace delivery of fresh food. *American Journal of Health Promotion*, *34*(3), 269–276. https://doi.org/10.1177/0890117119890804

Furness, B. W., Simon, P. A., Wold, C. M., & Asarian-Anderson, J. (2004). Prevalence and predictors of food insecurity among low-income households in Los Angeles County. *Public Health Nutrition*, *7*(6), 791–794. https://doi.org/10.1079/PHN2004608

Gundersen, C., & Ziliak, J. P. (2015). Food insecurity and health outcomes. *Health Affairs*, *34*(11), 1830–1839. https://doi.org/10.1377/hlthaff.2015.0645

Gundersen, C., Kreider, B., & Pepper, J. (2011). The economics of food insecurity in the United States. *Applied Economic Perspectives and Policy*, *33*(3), 281–303. https://doi.org/10.1093/aepp/ppr022

Haughey, L. (2024, November 22). The Nook opens: how faculty and staff can provide support. *Clemson News*. https://news.clemson.edu/the-nook-opens-how-faculty-and-staff-can-provide-support/

Jones, A. D. (2017). Food insecurity and mental health status: A global analysis of 149 countries. *American Journal of Preventive Medicine*, *53*(2), 264–273. https://doi.org/10.1016/j.amepre.2017.04.008

Keith-Jennings, B., Llobrera, J., & Dean, S. (2019). Links of the Supplemental Nutrition Assistance Program with food insecurity, poverty, and health: Evidence and potential. *American Journal of Public Health*, *109*(12), 1636–1640. https://doi.org/10.2105/AJPH.2019.305325

Kent, K., Visentin, D., Peterson, C., Ayre, I., Elliott, C., Primo, C., & Murray, S. (2022). Severity of food insecurity among Australian university students, professional and academic staff. *Nutrients*, *14*(19), Article 3956. https://doi.org/10.3390/nu14193956

Liebe, R. A., Adams, L. M., Hedrick, V. E., Serrano, E. L., Porter, K. J., Cook, N. E., & Misyak, S. A. (2023). Developing a conceptual framework for the relationship between food security status and mental health among low-income mothers. *Frontiers in Sustainable Food Systems*, *6*, Article 1078811. https://doi.org/10.3389/fsufs.2022.1078811

Liebe, R. A., Porter, K. J., Adams, L. M., Hedrick, V. E., Serrano, E. L., Cook, N., & Misyak, S. A. (2024). "I'm doing the best that I can": Mothers lived experience with food insecurity, coping strategies, and mental health implications. *Current Developments in Nutrition*, *8*(4), Article 102136. https://doi.org/10.1016/j.cdnut.2024.102136

Lin, B. B., Bichier, P., Liere, H., Egerer, M., Philpott, S. M., & Jha, S. (2024). Community gardens support high levels of food production, but benefit distribution is uneven across the gardener community. *Sustainability Science*, *19*(6), 2013–2026. https://doi.org/10.1007/s11625-024-01558-7

Loh, I. H., Oddo, V. M., & Otten, J. (2020). Food insecurity is associated with depression among a vulnerable workforce: Early care and education workers. *International Journal of Environmental Research and Public Health*, *18*(1), Article 170. https://doi.org/10.3390/ijerph18010170

Martin, M. S., Maddocks, E., Chen, Y., Gilman, S. E., & Colman, I. (2016). Food insecurity and mental illness: Disproportionate impacts in the context of perceived stress and social isolation. *Public Health*, *132*, 86–91. https://doi.org/10.1016/j.puhe.2015.11.014

Maynard, M., Andrade, L., Packull-McCormick, S., Perlman, C. M., Leos-Toro, C., & Kirkpatrick, S. I. (2018). Food insecurity and mental health among females in high-income countries. *International Journal of Environmental Research and Public Health*, *15*(7), Article 1424. https://doi.org/10.3390/ijerph15071424

Mozaffarian, D., Fleischhacker, S., & Andrés, J. R. (2021). Prioritizing nutrition security in the US. *JAMA*, *325*(16), 1605–1606. https://doi.org/10.1001/jama.2021.1915

Olayemi, V. O., Liebe, R. A., Serrano, E. L., Holmes, C., Davis, G., & Misyak, S. A. (2025). The association between changes in food security and core aspects of EFNEP programming: A path analysis. *Journal of Nutrition Education and Behavior*, *57*(10), 923–931. https://doi.org/10.1016/j.jneb.2025.06.016

Peduzzi, P., Concato, J., Kemper, E., Holford, T. R., & Feinstein, A. R. (1996). A simulation study of the number of events per variable in logistic regression analysis. *Journal of Clinical Epidemiology*, *49*(12), 1373–1379. https://doi.org/10.1016/S0895-4356(96)00236-3

Rabbitt, M. P., Reed-Jones, M., Hales, L. J., & Burke, M. P. (2024). *Household food security in the United States in 2023* (Report ERR No. 337). U.S. Department of Agriculture, Economic Research Service. https://doi.org/10.32747/2024.8583175.ers

Riddle, E. S., Niles, M. T., & Nickerson, A. (2020). Prevalence and factors associated with food insecurity across an entire campus population. *PLoS ONE*, *15*(8), Article e0237637. https://doi.org/10.1371/journal.pone.0237637

Schonberger, H. L., Yang, L. L., Chase, M., Drape, T., Misyak, S., & Boyer, R. (2022). Cooperative extension's capacity to address food insecurity by supporting food recovery organizations. *The Journal of Extension*, *60*(3), Article 15. https://doi.org/10.34068/joe.60.03.15

Seligman, H. K., Laraia, B. A., & Kushel, M. B. (2010). Food insecurity is associated with chronic disease among low-income NHANES participants. *The Journal of Nutrition*, *140*(2), 304–310. https://doi.org/10.3945/jn.109.112573

Smith, L. C., & Frankenberger, T. R. (2018). Does resilience capacity reduce the negative impact of shocks on household food security? Evidence from the 2014 floods in Northern Bangladesh. *World Development*, *102*, 358–376. https://doi.org/10.1016/j.worlddev.2017.07.003

Sowerwine, J., Sarna-Wojcicki, D., Mucioki, M., Hillman, L., Lake, F. K, & Friedman, E. (2019). Enhancing food sovereignty: A five-year collaborative tribal-university research and extension project in California and Oregon. *Journal of Agriculture, Food Systems, and Community Development*, *9*(B), 167–190. https://doi.org/10.5304/jafscd.2019.09B.013

Srinivasan, M., Cen, X., Farrar, B., Pooler, J. A., & Fish, T. (2021). Food insecurity among health care workers in the US. *Health Affairs*, *40*(9), 1449–1456. https://doi.org/10.1377/hlthaff.2021.00450

Swindle, T. M., Ward, W. L., Bokony, P., & Whiteside-Mansell, L. (2018). A cross-sectional study of early childhood educators' childhood and current food insecurity and dietary intake. *Journal of Hunger & Environmental Nutrition*, *13*(1), 40–54. https://doi.org/10.1080/19320248.2016.1227752

Swindle, T., Phelps, J., Schrick, B., & Johnson, S. L. (2021). Hungry is not safe: A mixed methods study to explore food insecurity in early care and education. *Appetite*, *167*, Article 105626. https://doi.org/10.1016/j.appet.2021.105626

Touchon, J. C. (2021). Generalized linear models (GLM). In J. C. Touchon, *Applied statistics with R: A practical guide for the life sciences* (pp. 181–208). Oxford University Press. https://doi.org/10.1093/oso/9780198869979.003.0007

U.S. Department of Agriculture, Economic Research Service [USDA ERS]. (2012). *U.S. household food security survey module: Three-stage design, with screeners.* https://www.ers.usda.gov/sites/default/files/_laserfiche/DataFiles/50764/26621_hh2012.pdf?v=3672.4

USDA ERS. (2026, March 3). *Food security in the U.S. – measurement.* https://www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-us/measurement

University of Washington. (2026). *The UW Food Pantry.* https://www.washington.edu/anyhungryhusky/the-uw-food-pantry/

Appendix

Supplementary Analyses

Food security status varied by job classification, college/unit, race, sex, marital status, job status/location, and educational attainment. For example, food insecurity was more prevalent among classified staff and those with lower educational attainment. Tables A1–A5 provide detailed breakdowns by these characteristics.

Table A1. Food Security by Job Classification Among Cooperative Extension Employees at a Southeastern Land-Grant University

Job Classification	*n*	Food Secure (%)	Food Insecure (%)
Administrative and Professional (AP) Faculty	42	78.6	21.4
Teaching and Research Faculty	14	85.7	14.3
Part-Time Faculty	3	66.7	33.3
Classified Staff	12	66.7	33.3
University Staff	21	76.2	23.8
Tenure-Track Faculty	3	100.0	—

Table A2. Food Security by Race and Marital Status Among Cooperative Extension Employees at a Southeastern Land-Grant University

	n	High Food Security (%)	Marginal Food Security (%)	Low Food Security (%)	Very Low Food Security (%)
Race					
Black or African American	10	30.0	20.0	10.0	40.0
White	82	58.5	22.0	9.8	9.8
Others [a]	3	33.3	66.7	-	-
Marital Status					
Married	56	66.1	17.9	5.4	10.7
Divorced/Separated/Widowed	13	53.8	15.4	23.1	7.7
Never Married	26	30.8	38.5	11.5	19.2

[a] American Indian or Alaska Native; Asian.

Table A3. Food security by Sex Among Cooperative Extension Employees at a Southeastern Land-Grant University

Sex	*n*	High Food security (%)	Marginal Food Security (%)	Low Food Security (%)	Very Low Food Security (%)
Male	13	53.8	15.4	15.4	15.4
Female	82	54.9	24.4	8.5	12.2

Table A4. Food Security by Job Status and Educational Attainment Among Cooperative Extension Employees at a Southeastern Land-Grant University

	n	High Food security (%)	Marginal Food Security (%)	Low Food Security (%)	Very Low Food Security (%)
Job Status					
On-campus	15	60.0	26.7	-	13.3
Off-campus, not at home	67	50.7	22.4	11.9	14.9
Off-campus, at home	3	33.3	33.3	33.3	-
Hybrid	10	80.0	20.0	-	-
Educational Attainment					
High school or GED or less than a high school diploma	14	28.6	21.4	14.3	35.7
Some College	7	42.9	-	28.6	28.6
Associate	9	55.6	44.4	-	-
Bachelor	18	27.8	38.9	11.1	22.2
Postgraduate	47	74.5	17.0	6.4	2.1

Table A5. Concerns About Food Lasting Among Cooperative Extension Employees at a Southeastern Land-Grant University

	n	%
We worried whether our food would run out before we got money to buy more (*N* = 95)	25	26.3
The food that we bought just didn't last, and we didn't have money to get more (*N* = 93)	23	24.7
We couldn't afford to eat balanced meals (*N* = 95)	24	25.3
Did you ever cut the size of your meals or skip meals because there wasn't enough money for food? (*N* = 41)	16	39.0
Did you ever eat less than you felt you should because there was not enough money for food? (*N* = 73)	20	27.4
Were you ever hungry but didn't eat because there wasn't enough money for food? (*N* = 94)	9	9.6
Did you lose weight because there wasn't enough money for food? (*N* = 91)	6	6.6
Did you/other adults in your household ever not eat for a whole day because there wasn't enough money for food? (*N* = 24)	6	25.0