



Something to eat: experiences of food insecurity on the farm

Briana E. Rockler¹ · Stephanie K. Grutzmacher² · Jonathan Garcia² · Marc T. Braverman³ · Ellen Smit²

Accepted: 10 March 2023 / Published online: 2 May 2023
© The Author(s), under exclusive licence to Springer Nature B.V. 2023

Abstract

The health of farm owners and farmworkers has significant impacts on farm businesses, farming families, and local rural communities where agriculture is an important driver of social and economic activity. Rural residents and farmworkers have higher rates of food insecurity, but little is known about food insecurity among farm owners and the collective experiences of farm owners and farmworkers. Researchers and public health practitioners have stressed the need for policies that target the health and well-being of farm owners and farmworkers while remaining sensitive to the nature of life on the farm, yet farm owner and farmworker lived experiences have been understudied, especially in relation to one another. In-depth qualitative interviews were conducted with 13 farm owners and 18 farmworkers in Oregon. Modified grounded theory was used to analyze interview data. Data were coded using a three-stage process to identify salient core characteristics of food insecurity. Farm owner and farmworker meanings and interpretations of their food insecurity were often contradicted by evaluated food security scores using validated quantitative measures. According to such measures, 17 experienced high food security, 3 had marginal food security, and 11 had low food security, but narrative experiences suggested higher rates. Narrative experiences were categorized by core characteristics of food insecurity, including seasonal food shortages, resource stretching, working extended hours most days of the week, limited use of food assistance, and the tendency to downplay hardship. These unique factors have important implications for developing responsive policies and programs to support the health and well-being of farm livelihoods whose work enables health and well-being among consumers. Future studies to test the relationships between the core characteristics of food insecurity identified in this study and farm owner and farmworker meanings and interpretations of food insecurity, hunger, and nourishment are warranted.

Keywords Food insecurity · Farmer · Farmworker · Farm owner · Hunger · Rural health

✉ Briana E. Rockler
rocklebe@uwec.edu

Stephanie K. Grutzmacher
stephanie.grutzmacher@oregonstate.edu

Jonathan Garcia
jonathan.garcia@oregonstate.edu

Marc T. Braverman
marc.braverman@oregonstate.edu

Ellen Smit
ellen.smit@oregonstate.edu

Abbreviations

FI	Food insecurity
FS	food security
USDA	U.S. Department of Agriculture
HFSSM	Household Food Security Survey Module
SNAP	Supplemental Nutrition Assistance Program

Introduction

Farming is associated with environmental, financial, and social risks and stressors that ultimately impact the health and well-being of every individual employed on the farm (Health Resources and Services Administration 2019a). While farm owners and farmworkers¹ play a critical role

¹ Department of Public Health and Environmental Studies, College of Arts and Sciences, University of Wisconsin - Eau Claire, Hibbard Humanities Hall 384, 124 Garfield Ave, Eau Claire, WI 54702, USA

² School of Biological and Population Health Sciences, College of Public Health and Human Sciences, Oregon State University, 101 Milam Hall, Corvallis, OR 97331, USA

³ School of Social and Behavioral Health Sciences, College of Public Health and Human Sciences, Oregon State University, 401 Waldo Hall, Corvallis, OR 97331, USA

¹ The terms “farmer,” “farmworker,” “worker,” and “laborer” are not mutually exclusive categories. Every individual who works on a farm could be considered a farmer by trade. For the purposes of this study

in the production of food, often working long hours in hazardous conditions among isolated rural areas (Brotherson 2016), low availability of household resources and limited access to food retailers may lead to inadequate access to food at home (Braun 2019; Health Resources and Services Administration 2019b). Among farmworkers, food insecurity (FI) is widely documented across the U.S., particularly for Hispanic/Latinx migrant and seasonal farmworkers (Kiehne and Mendoza 2015; Ip et al. 2015). While scholars have called attention to hunger and FI among farmworkers as evidence of systematic inequities within the food system (Mares 2019; Brown and Getz 2020), FI among U.S. farm owners has not been examined in the academic literature, despite their proximity to farmworkers. High rates of FI within rural agricultural communities may provide insight into the circumstances faced by farming communities, including farm owners and their families (Dewitt et al. 2020).

The literature on FI among farmworkers includes data on the prevalence of FI and identifies the risk factors (Borre et al. 2010; Hill et al. 2011; Kandel 2008; Kilanowski and Moore 2010; Quandt et al. 2004; Weigel et al. 2007; Wirth et al. 2007), health consequences (Kilanowski and Moore 2010; Quandt et al. 2006; Weigel et al. 2007) and coping strategies (Borre et al. 2010; Meierotto and Som Castellano 2020; Quandt et al. 2004; Weigel et al. 2007; Wirth et al. 2007) of FI among farmworkers. Though rates of FI vary by study due to methodological differences like sampling frame, study methods including the use of recall data, and low response rates (45–82%), estimates are consistently higher than the general population by generous margins (Kiehne and Mendoza 2015; Ip et al. 2015). Structural inequities embedded within the food system make farmworkers more likely to experience FI, including a lack of control over occupational and housing conditions, low wages, low literacy, financial remittance obligations, a lack of legal protections, and a lack of access to public assistance related to their legal immigration status, and residing in isolated rural regions (Allen 2008; Arcury and Marín 2009; Borre et al. 2010; Brown and Getz 2020; Minkoff-Zern 2014; Sano et al. 2011). While this foundational evidence details the conditions that predict farmworker FI, less is known about the psychosocial experiences and core characteristics of FI among U.S. farmworkers.

Meanwhile, the body of research on the well-being of U.S. farm owners takes a less biosocial approach (Hadley

and Crooks 2012) by focusing on farm outputs, economies, and agribusiness (Rissing et al. 2020). Small-scale farms that focus on food production for local markets are more likely to encounter issues with farm profitability due to a lack of infrastructure to process, market, and distribute their products (Berkey 2014). Although the pathways that connect farm operations with the well-being of farm households are not well established (Rissing et al. 2020), farm owners that struggle to make ends meet, including those that employ farmworkers, may also confront FI. Research among small-scale farm owners would help clarify our understanding of FI on the farm. Further, little is known about the experiences of farm owners and farmworkers jointly. As the two populations do not operate independently of one another within the food system, addressing farmworker health and well-being without exploring the role of farm owner precarity ignores the very hierarchies of power within agricultural labor that perpetuate farmworker FI. Considering the challenges and experiences of farm owners and farmworkers together may help provide a more comprehensive understanding of the difficulties encountered by farming communities that share many of the same unique vulnerabilities as agricultural laborers.

As the health of farm owners and farmworkers has consequential impacts for farm businesses, farming families, and local rural communities where agriculture is a significant driver of social and economic activity (Brumby et al. 2009; Isserman et al. 2009), researchers and public health practitioners have stressed the need for dynamic policies that target the health and well-being of farm owners and farmworkers while remaining sensitive to the nature of life on the farm (American Public Health Association 2017; Braun 2019). Though many farm owners possess distinctly different characteristics from farmworkers, the farming communities to which they belong are vulnerable to agricultural market uncertainties, increasingly unpredictable weather, social isolation, physical hazards of farm labor, and a lack of health insurance, among others (Ketterman et al. 2021). Further, both farm owner and farmworker well-being are influenced by the viability of farm businesses; thus, their well-being may be inextricably linked (Berkey and Schusler 2016). When farm owners struggle to provide a living for themselves and their families, they may also struggle to provide just working conditions for farmworkers (Berkey and Schusler 2016). Studies show that farm size and farm business practices affect the working conditions and fringe benefits offered to farmworkers (Arcury and Marín 2009; Shreck et al. 2006). Farmworkers employed on small farms (< \$350,000 in annual sales) have reported poorer health compared to farmworkers employed on larger farms (Villarejo 2012). Although most (89%) of the farms in the U.S. are categorized as small family farms (Whitt et al. 2022),

the term “farm owner” is used to describe those individuals who own and operate their farm business and “farmworker” is used to describe those who labor on farms but do not have ownership responsibilities, often in a seasonal capacity. While this terminology is consistent with the literature, it is noted that these titles do not fully capture the nuances and nature of life on the farm.

and the challenges faced by those farm owners may impact their relationship with farmworkers and farmworker health, the health of farm owners on these small farms has not been documented in the published literature. The lived experiences of farm owners have been understudied, making it challenging to create responsive policies and programs to support rural farming communities that include farm owners and farm workers, particularly those comprised of economically fragile small family farms (Whitt et al. 2022).

Measures of food insecurity

Some measures of FI do not capture the full spectrum of the experience of FI, and this issue may be salient among farm owners and farmworkers who experience unique vulnerabilities and stressors related to the food system. Previous studies have estimated rates of FI among farmworkers using the U.S. Department of Agriculture (USDA) Household Food Security Survey Module (HFSSM) (Allen 2008; Arcury and Marin 2009; Borre et al. 2010; Brown and Getz 2020; Minkoff-Zern 2014; United States Department of Agriculture 2012). The HFSSM is a valuable, widely trusted tool that the federal government has utilized to monitor national food security annually since 1998. The HFSSM has been adapted and validated for use across diverse cultures and settings (Perez-Escamilla and Segall-Correa 2008). As the HFSSM assesses food security with experience-based quantitative measures of FI, it has been regarded as a conservative measure to capture severe cases of FI, such as circumstances in which individuals skip meals or eat so little they lose weight (Johnson et al. 2020). As such, the HFSSM may best identify households that experience more severe FI but overlook those who experience less severe, borderline, or variable FI. Researchers have noted these limitations. In an ethnographic study of two low-income populations in rural Oregon, Gross and Rosenberger (2005) found that participants' evaluated FS (indicated by their HFSSM score) did not align with their lived experiences as many study participants evaluated as food secure shared experiences akin to FI. For example, evaluated food secure participants in their study reported living on macaroni and cheese or ramen noodles to make ends meet until they had the resources to obtain healthier food options. Likewise, in Mares' ethnography of Latinx farmworkers in Vermont (2019), she found the HFSSM failed to capture the social, cultural, and political contexts of FI experienced by farmworkers. While the HFSSM helps provide standardized data, complementary measures may be necessary to provide a more comprehensive picture of lived experiences of FI/FS (Maynard et al. 2019; Ready 2016; Coates et al. 2003). To better understand FI/FS, Radimer et al. (1990) described the lived experiences of FI with quantitative, qualitative,

social, and psychological elements. Building on Radimer's research, Hamelin et al. (2002) developed a framework to characterize the core experiences of FI among low-income households in Canada. The Hamelin framework includes the following characteristics: a lack of food, including food shortage (quantitative), suitability (qualitative), and worry (psychological); and alienation, including a lack of control and hiding FI (psychosocial) (Hamelin et al. 2002; Johnson et al. 2020).

The present study applies both the USDA HFSSM and Hamelin et al.'s framework (2002) to capture quantitative FI data and characterize the unique lived experiences of FI for 31 farmworkers and small-scale farm owner-operators working in Oregon. As such, this study aims to provide a better understanding of the experiences of FI among farm communities in Oregon.

Methods

Data collection and participants

A convenience sample of 31 farmworkers ($n = 18$) and farm owners ($n = 13$) was recruited between 2018 and 2020. Each participant was offered a snack and received \$25 for their time. Farmworkers were recruited from social service agencies or orchards using informational brochures and on-site. Farm owners who owned and operated small farm businesses were recruited from farmers markets, local farm directories, and Cooperative Extension contacts and listservs. The researchers' affiliation with Cooperative Extension was advantageous, as Extension staff had a trusted reputation within rural communities that may have otherwise not agreed to participate.

In-depth, semi-structured interviews were conducted in Spanish or English, during the agricultural off-season. Informed consent to participate and publish was obtained verbally from farmworkers and in written form from farm owners before their interview. Interviews ranged between 40 and 159 min. The Oregon State University Institutional Review Board approved this study.

Measures

A semi-structured interview guide was designed to explore FI among farm owners and farmworkers and the mechanisms they use to cope with FI as central phenomena (Creswell et al. 2007). Participants were encouraged to share relevant narratives and anecdotes, and interviewers were trained to use follow-up questions to explore emerging theoretical constructs and topics that captured practices, relevant terminology, and the complexities of participants'

perceptions and experiences (Patton 2002). For interviews with farm owners, the primary author refined questions within the interview guide in an iterative process to reflect emerging themes (Agee 2009; Charmaz 2004; Creswell et al. 2007).

The 6-Item HFSSM Short Form was derived from the 18-item HFSSM. The 6-item HFSSM has been described as a robust tool to identify food insecure households and households with very low FI with high specificity (92%) and sensitivity (98%), and minimal bias relative to the 18-item measure (Blumberg et al. 1999). The HFSSM scoring system evaluated food security with four categories: high food security (0 affirmative answers), marginal food security (1 affirmative answer), low food security (2–4 affirmative answers), and very low food security (5–6 affirmative answers). The 6-Item HFSSM in the current study was used for triangulation of the lived experience and quantitative elements of FI using a widely utilized and accepted scale.

Analysis

Interviews were digitally recorded and transcribed verbatim in the language of the interview using a professional transcription service. Spanish language interviews were translated into English, and English transcripts were used for coding.

The authors analyzed the data using a modified grounded theory approach. The goal was to create a description of FI among the farm workforce that was grounded in or emerged from interview data. We used Hamelin et al.'s conceptual framework to code core characteristics of household FI: a lack of food: shortage, suitability, and worry, and alienation: a lack of control, and hiding FI. Emergent codes designated farm owner and farmworker experiences that were misaligned with their evaluated HFSSM score, for example, when a participant had an evaluated HFSSM score indicating they were food secure, but shared experiences that suggested they encountered periods of FI.

Using MAXQDA, data were coded in three stages. First, the primary author conducted open coding interview transcripts during which emerging themes were identified and sorted into elements. Next, axial coding allowed for a more extensive analysis of each element and the interrelations between each. The primary and senior authors convened to discuss emergent codes, consider alternatives and determine selective codes. Last, the primary author conducted selective coding to reveal the core characteristics of FI using the Hamelin framework (Saldaña 2016; Hamelin et al. 2002).

The strategy of data collection, analysis, and interpretation of findings for this study was designed with respect to the rigor and trustworthiness of this qualitative study using established quality criteria (Korstjens and Moser 2018;

Krefting 1991). Some farm owners were recruited through a nominated sample by Oregon State University Extension Agents with whom they had pre-established relationships to strengthen the transferability of the study. Interview techniques promoted study credibility with time sampling and open-ended questions reframed and repeated in various ways. The engagement of three interviewers and two researchers for data analysis encouraged triangulation of investigators' ideas and codes, which allowed for the consideration of differing interpretations of study findings. The primary author used a code-recode process for the first stages of analysis where data was open-coded, coded again two weeks later, and then findings were compared for consistency to ensure study dependability. Last, to increase study confirmability, the primary author shared post-interview reflections with the senior author to consider emerging themes and the influence of the authors' lens and interests with respect to the study participants' experiences.

Results

Sample characteristics

Participants (N=31) included 18 farm workers and 13 farm owners in Oregon (Tables 1 and 2). Among farm workers, 6 females and 12 males aged 30–73 years (mean=50.3) were interviewed. All participants were Spanish-speaking, Hispanic/Latinx, and born outside of the U.S. All lived in the U.S. and were not H2A guest workers. Seven reported sending financial remittances to families in their country of origin. Most were married and cohabitating, and two-thirds had children under 18 at home. Most (94%) reported work instability characterized by seasonal income. One participant made income off the farm to supplement their farm income. According to the scores indicated by the USDA 6-item HFSSM, half (n=9) of the farm workers had high food security, two had marginal food security, and seven had low food security.

Among farm owners, 10 females and 3 males aged 31–75 (mean=47.4) were interviewed. All participants were English-speaking, twelve were born in the U.S., and eleven were White. Like the farm workers in the study, most farm owners were married and cohabitating, but only one farm owner had children under 18 at home. 31% reported work instability, however, six farm owners supplemented their farm income with off-farm jobs. All farm owners also managed and operated their small farms (farm income <\$350,000) located throughout Oregon, two of which were family farms. Most (n=11) farm owners also owned the land they were farming upon. Farm types included fresh produce multi-crop, orchard, and ranch/livestock. The majority (n=9) employed

Table 1 Farmworker demographic and descriptive data (n = 18)

Farmworkers	Ethnicity	Sex	Age	Evaluated food security status	Household size	Children at home	Off-farm job
	Hispanic/Latinx	Female	44	Low	3	Yes	No
	Hispanic/Latinx	Male	45	Low	2	No	No
	Hispanic/Latinx	Female	50	Low	3	Yes	No
	Hispanic/Latinx	Female	52	Low	2	No	No
	Hispanic/Latinx	Male	56	Low	3	Yes	No
	Hispanic/Latinx	Male	65	Low	5	Yes	No
	Hispanic/Latinx	Male	72	Low	5	Yes	No
	Hispanic/Latinx	Female	38	Marginal	1	No	Yes
	Hispanic/Latinx	Male	42	Marginal	3	Yes	No
	Hispanic/Latinx	Male	30	High	2	No	No
	Hispanic/Latinx	Male	35	High	5	Yes	No
	Hispanic/Latinx	Male	43	High	5	Yes	No
	Hispanic/Latinx	Male	46	High	4	Yes	No
	Hispanic/Latinx	Female	50	High	3	Yes	No
	Hispanic/Latinx	Male	53	High	2	No	No
	Hispanic/Latinx	Male	54	High	2	Yes	No
	Hispanic/Latinx	Male	58	High	1	No	No
	Hispanic/Latinx	Female	73	High	3	Yes	No

Table 2 Farm owner demographic and descriptive data (n = 13)

Farm owners	Race	Sex	Age	Evaluated food security status	Household size	Children at home	Off-farm job	Farm type	Employs farm-workers
	White	Female	34	Low	2	No	Yes	Multi crop farm	Yes
	White	Female	35	Low	2	No	Yes	Multi crop farm	Yes
	White	Female	40	Low	4	Yes	Yes	Multi crop farm	No
	White	Female	63	Low	1	No	No	Multi crop farm	Yes
	White	Female	56	Marginal	2	No	No	Multi crop farm	Yes
	White	Female	31	High	2	No	Yes	Orchard	Yes
	Asian	Female	35	High	2	No	No	Orchard	Yes
	White	Male	35	High	2	No	Yes	Multi crop farm	Yes
	White	Male	36	High	2	No	No	Ranch/Livestock	Yes
	Asian	Female	43	High	2	No	No	Multi crop farm	No
	White	Female	60	High	1	No	No	Orchard	Yes
	White	Female	73	High	2	No	No	Ranch/Livestock	No
	White	Male	75	High	2	No	Yes	Ranch/Livestock	No

farmworkers at some point during the year. USDA 6-item HFSSM scores indicated eight farm owners had high food security, one had marginal food security, and four had low food security.

Decontextualized measures of food insecurity

The HFSSM was administered during participant interviews during which farm owners and farmworkers were provided the opportunity to discuss their responses to quantitative survey measures. As participants added context or personal anecdotes to support their answers to the 6 survey questions, their narratives revealed misalignment between participant experiences and their evaluated food security score. For example, one HFSSM question states, “In the last 12 months, did you ever eat less than you felt you should

because there wasn’t enough money for food?” Response options included yes, no, or don’t know. The following statements show how two farm owners responded to this question:

A 40-year-old White female farm owner with low evaluated food security responded, “yes”:

Absolutely. Yeah. We have, like, survival food is what we call it, so we’ll have things that are cheaper that we’ll make to subsidize the real food. Like popcorn, we’ll supplement with popcorn or something.

A 63-year-old White female farm owner with low evaluated food security responded, “no”:

I would say no. But what I'd do is I just try to be more creative, like, how to get enough without it costing a lot. I make a big thing of rice and doctor it up and do things to be frugal.

Though the two farm owners responded differently to the HFSSM question about reducing food intake, their narratives revealed comparable experiences of reducing dietary variety to manage food shortages, highlighting how participant experiences contextualized their evaluated food security, often in contradictory ways. In this case, we see one individual who interpreted her variety reduction as a necessity cued by the need to reduce food intake. In contrast, the other individual interpreted the same strategy as a coping mechanism that helped her avoid reducing her food intake. While the HFSSM categorized their two “Yes” or “No” responses as separate, distinct experiences, employing the Hamelin framework allowed us to characterize their two responses as congruent experiences. Still, like how the HFSSM scores misaligned with participants’ narratives, we also find that some categories from the Hamelin framework misalign with participant perspectives. We characterized behaviors related to experiences of FI according to technical definitions of FI/FS that use availability, access, utilization, and stability as pillars of FS, while farm owner and

farmworker perspectives do not always match those characterizations. In the absence of a severe lack of food or physical cues of hunger, most participants did not perceive their routine and widely accepted experiences, like the drive to overwork to meet food needs throughout the year, as experiences related to FI. As such, the HFSSM and Hamelin framework may have been more sensitive to measures of FI (according to technical definitions) than the participants who experience them were.

Characteristic experiences of food insecurity on the farm

The following findings, organized by characteristic experiences of FI, detail the ways in which farm owners and farmworkers with a range of evaluated food security scores (high, marginal, and low) experience FI/FS. According to farm owner and farmworker descriptions of their experiences, core characteristics of household food insecurity (Hamelin et al. 2002) revolved around seasonal resource shortages that resulted in a lack of food at some point during the year, the related mechanisms they used to stretch resources to sustain the household year-round, and the tendency to downplay their circumstances (Table 3).

A Lack of Food The primary referent for participant conceptualizations of FI was a distinct absence of food and related experiences of hunger. Many farm owners and farmworkers shared characteristic experiences of FI that were not perceived as such, possibly because these experiences were more moderate or variable than their understanding of FI. While we observed similar core characteristics of FI experienced by both farm owners and farmworkers, the ways that each is situated impacted the resources they could access as well as their coping mechanisms (Table 4).

Shortage Participants commonly encountered predictable but difficult food shortages during the winter, a season of limited or non-existent earning opportunities in agriculture. During this agricultural off-season, farm owners and farmworkers employed various coping strategies. Farm owners and farmworkers prepared for the winter by budgeting and setting aside money to support their food access through the winter. One farmworker noted how saving money helped him sustain a regular diet during the winter: “I try to save a lot of money. When you don’t have any money, you don’t eat the same things you eat when you have money.” (58-year-old Hispanic/Latinx male with high evaluated food security). Participants also reported making trade-offs to address their food shortages. For example, a 36-year-old White male farm owner with

Table 3 Experience of household food insecurity among farm owners and farmworkers in Oregon (N = 31)

USDA 6-item Household Food Security Survey		
Evaluated Food Security Scores	High: 0 affirmative responses	17
	Marginal: 1 affirmative response	3
	Low: 2–3 affirmative responses	11
	Very Low: 4 + affirmative responses	0
Characteristic Experiences of Food Insecurity on the Farm		
A Lack of Food:	Year-round food behaviors affected by seasonal shortages	
Shortage	<i>Experiences of food insecurity during the agricultural off-season, typically December-February</i>	
Suitability	<i>Reliance on unvaried staple foods like beans and rice often expressed as an asset</i>	
Worry	<i>Preoccupation with food may be overshadowed by experiences with co-occurring, unique stressors rooted in farm labor, immigration, low wages</i>	
Alienation:	Appraisals of food insecurity informed by subjective social status (social comparisons)	
A Lack of Control	<i>Work provided control over difficult circumstances and access to food</i>	
Hiding Food Insecurity	<i>Rooted in individualism, obstructed confidence in the utilization of formal and informal food assistance</i>	
Dynamic Nature of the Whole Experience		

Table 4 Farm Owner and Farmworker Vulnerabilities and Coping Strategies

Vulnerabilities			
Theme	Farm owners and Farmworkers	Farm owners	Farmworkers
Systemic	Experienced structural issues related to their role in the food system that made it difficult to thrive	Faced issues with farm profitability: the high cost of growing food in a system that values “cheap” food	Encountered work injuries that hindered their ability to work and access food, low wages
Immigration	Experienced difficulties and uncertainty related to immigration enforcement	Found it difficult to hire the farmworkers needed to ensure farm maintenance and farm profitability due to threats of deportation and barriers to immigration	Lived in fear of losing residency and income, threats of deportation were a barrier to employment and engagement in the workforce
Coping Strategies			
Theme	Farm owners and Farmworkers	Farm owners	Farmworkers
Diet	Always had <i>something to eat</i> , with access to staple foods like beans, rice, eggs, bread, potatoes, and oatmeal, so they did not go hungry	Expressed satisfaction with their staple foods	Expressed that more nutritive foods were difficult to access during winter and early spring, would grow peppers, tomatoes, salad greens, onions, squash, and cucumbers in the agriculturally productive season
Food access	Made tradeoffs to meet food needs	Prioritized food access and quality over ideal housing or transportation conditions	Paid bills late to access food, or did not eat to ensure bills were paid on time
Financial	Relied on loans to meet food needs seasonally	Engaged with formal financial institutions to acquire loans, traded goods and services	Acquired personal loans through family members, friends, or employers, had roles as borrowers and as lenders with family and friends who would provide and share food
Subjective social status	Used their subjective social status as food producers, proximity to food, to inform perceptions of their situation	Made comparisons to demographically similar groups who are worse off	Made comparisons to previous experiences of struggle and being worse off
Overwork	Engaged in additional work to supplement income, expressed feelings of powerlessness	Engaged in off-farm work	Engaged in work on other farms and in construction
Food assistance	Hesitated to utilize formal or informal food assistance, preferred self-reliance	Grappled with their relationship with the food bank as both donors and customers	Valued privacy in accessing food assistance

high evaluated food security lived in an on-farm shed without electricity, yet he emphasized that he and his wife were “eating what we want to be eating.” Another farm owner, a 31-year-old White female with high evaluated food security stated, “[My husband and I] have really crappy cars, but we eat well.” Farmworkers also made trade-offs between paying bills or buying groceries. One farmworker prioritized her food needs above paying her bills on time:

If I [only] have [enough] money to [pay my electricity bill], and I have to pay electricity on the 12th, or 13th, even if I pass the bill [due date] by a day or two, I'd rather pay the electric bill later and have something to eat. (50-year-old Hispanic/Latinx female farmworker, marginal evaluated food security)

Whereas another farmworker prioritized paying her bills on time over her food needs:

I have to save money and only spend it on the most important things. When we have to pay rent, I have to use that money to pay for rent and to pay the electric bill... And that is how we have been able to make it through the winter. Sometimes we have just a few dollars left to buy groceries. (50-year-old Hispanic/Latinx female farmworker with low evaluated food security)

While farm owners' trade-offs centered upon cost savings which enabled them to participate in the economy year-round, farmworker trade-offs involved immediate needs with individuals choosing between food access or electricity. Farmworkers who encountered overdue bills risked a loss of electricity and impeded their opportunity to engage with formal financial institutions, build credit, and engage with the economy. Established credit proved to be essential for farm owners who relied on taking out loans to get through the winter:

We have no actual real money in the bank right now, but we are doing that – I mean, seasonally, we've used a line of credit many years to get us from November, kind of when our income stops, until February. (56-year-old White female farm owner with marginal evaluated food security).

Instead of formal loans, farmworkers described utilizing informal resources like visiting the local food bank or taking out personal loans with family members, friends, or employers: "My husband's family helps us with food. Sometimes I borrow money for groceries, and I pay them back later. And sometimes they give me food." (50-year-old Hispanic/Latinx female farmworker with low evaluated food security). Finances permitting, farmworkers also provided loans to other members of their community in need of assistance: "I feel good being able to help another person. When they ask for a loan, if you have [money available], then you can lend it to them, then they'll pay you back." (72-year-old Hispanic/Latinx male farmworker with low evaluated food security). Such strategies highlighted the importance of a robust social network and community resources for the farmworker community. Although seasonal food shortages affected farm owners and farmworkers throughout the year, many participants explained that they always had *something to eat* or food available to sustain them until they can access more.

One farmworker with high evaluated food security explained:

When there are not enough resources [to get food], it's stressful. I get a little stressed. But it almost never happens, you know? It has not happened that we get to the extreme of saying, "oh, I don't have anything to eat today." At all times, there is something, something to eat. (43-year-old Hispanic/Latinx male)

Another farmworker with low evaluated food security shared similar sentiments:

Well, there have been times that we do not have, let's say, money to buy food, but almost always, we have had something to eat. (73-year-old Hispanic/Latinx female)

Participants grounded their appraisals of their experiences with FI in having access to *something to eat*. While objective definitions of FI are characterized by reducing the size and variety of foods, the farm owners and farmworkers in this study favored meanings of FI that related to experiences with hunger. As most farm owners and farmworkers always had *something to eat*, this food safeguarded them from experiencing hunger. They did not characterize this as FI.

Suitability Hamelin's framework includes severe monotony of diet and nutritional compromises as part of an unsuitable diet related to FI. While food variety is often considered a vital component of a quality diet (Murphy et al. 2006), it emerged as a less important feature of participants' perceptions of their FI.

Building upon the significance of *something to eat* as a safeguard against hunger, participants referenced the go-to staple foods they kept in the cupboard, including beans, rice, eggs, bread, potatoes, and oatmeal. Staple foods were framed as an asset rather than monotonous and nutritionally compromising. One farm owner with high evaluated food security explained: "For me, if I have nothing else to eat, I can eat a can of beans, I can eat them every day, and I'd be happy." (60-year-old White female). Staple foods provided farm owners and farmworkers security from experiences of hunger during the temporary periods in which they found themselves short on food: "Thank God I have never gone without food. I always have beans or eggs available." (35-year-old Hispanic/Latinx male farmworker with low evaluated food security). These staple foods were consumed throughout the year and allowed participants to live frugally, which enabled them to save money for the winter. One farm owner with low evaluated food security described how she purchased beans and rice in bulk and prepared them at the beginning of

the week to eat through the week. She explained: “I’m not starving or anything. But I am very careful. I just eat beans and rice. It’s never gotten to the point where I’ve not been able to find enough food.” (63-year-old White female). The salient theme among these experiences was that staple foods protected farm owners and farmworkers from experiencing hunger and severe FI. Though limiting dietary diversity is one of the core characteristics of FI described by Hamelin et al., farm owners and farmworkers viewed their reliance on staple foods as a positive asset rather than a negative experience.

While staple foods provided security, many farmworkers recognized that access to nutritious foods came at an out-of-reach price tag. One participant shared, “There are things that provide more nutrition to your body, but they’re worth more money. [We] can’t buy it because we don’t make enough.” (30-year-old Hispanic/Latinx male farmworker with high evaluated food security). Many shared their preference for fresh, non-processed fruits and vegetables, many of which they could grow themselves like tomatoes, chili peppers, salad greens, onions, squash, and cucumbers. It was notable that none of these preferred fresh foods were included as staples (the foods they always have available even in times of food shortages), suggesting that when farmworkers have to or choose to rely upon staple foods, they may make sacrifices to their diet by selecting foods they prefer less and know to be less nutritious because the more nutritious options are only available to them seasonally when they can grow them. Farm owners did not express the same sentiments, rather, many were content with their food availability year-round, “I’ve never really liked packaged food or frozen food, but I really like beans and rice.” (60-year-old White female farm owner with high evaluated food security). Two farm owners, one with high evaluated food security and one with low evaluated food security, maintained gardens separate from their farm business where they would plant vegetables for their personal consumption. Among farm owners and farmworkers, most reported that they could access the quality and types of food they preferred on the USDA HFSSM, even those who relied on staple foods at times. As food shortages were primarily reported during the agricultural off-season, the temporary nature of the sacrifices farm owners and farmworkers make to their diet may have minimized participant concerns regarding the unsuitability of their staple foods.

Participants shared some concerns related to food unsuitability for their children. Parents voiced their worries regarding the quality of their children’s diets

and the health impacts of processed and fast foods. Seven out of the ten parent participants reported that their family qualified for free and reduced-price school lunches, but their children did not enjoy the foods offered to them at school. One farmworker explained: “There are times when he arrives [back home] very hungry and says ‘I didn’t eat. The food wasn’t good. I just drank my milk’.” (54-year-old Hispanic/Latinx male farmworker with high evaluated food security). Due to these experiences, few parents relied on the school lunch program to feed their children; thus, the program did little to address the household burdens of FI.

Worry Hamelin’s framework describes “uncertainty about tonight” (current uncertainty) and “uncertainty about next week and the following weeks” (future uncertainty) as characteristics of preoccupations with access to food (worry). Provided the unique vulnerabilities encountered by farming communities, participants stressed over a range of factors that contributed to, and overshadowed, preoccupations with access to enough food. There were distinct differences between the salient vulnerabilities that emerged between farm owners and farmworkers, reflective of the positionality of each group within the food system. While farm owners primarily faced challenges associated with the precarity of the farm business, farmworkers faced issues with the hazards of farm labor, immigration, and low-wage employment.

Farms are filled with risk. Farm owners and farmworkers had endless farm responsibilities, many of which were physically demanding and filled with occupational hazards like operating farm machinery and exposure to noxious chemicals. Such hazards contributed to farmworkers’ worries about food access for some participants. For example, one 65-year-old Hispanic/Latinx farmworker with low evaluated food security described how injuries in the field prompted his early retirement, which led to his experiences with FI. He shared his reflections about farm labor: “They were long and hard hours, but what can I tell you? Nothing in life is easy. All of the things you have to earn through hard work. The thing that [has] damaged me the most are the work-related injuries. Unfortunately, I had three accidents in the field.” Meanwhile, farm owners grappled with threats to farm profitability including reduced sales from trade wars and tariffs, falling commodity prices, crop loss to wildlife and climate variability, water insecurity, and inconsistent income from season to season. Though many of these threats increased farm owner vulnerability to FI,

particularly those that decreased household income, sometimes worry about food access fell secondary to these burdens of running a farm business: “I’m not sad about our food... [I’m sad because] we are spending money, our resources, and our lives to grow food that we’re not being compensated for in a way that is fair.” (31-year-old White female farm owner with high evaluated food security). While unfair compensation may have contributed to a lack of resources and experiences with FI, this farm owner’s comment highlights her frustrations with the food system instead of her food access.

Issues related to immigration also burdened farmworkers and farm owners in different ways (Table 4). Farmworkers reported fears of losing their U.S. residency, language barriers, and related physical and psychological stress. Immigration-related factors added to the financial encumbrances of farmworkers. One described how he struggled to stretch his farm income to support his family living with him in the U.S. and his family residing in Mexico, which resulted in uncertainty regarding food: “I have to help my parents, who are in Mexico. From my check, I send a little bit for them. And to buy food for me, sometimes, that worries you. You go to the store, and you barely have enough.” (54-year-old Hispanic/Latinx male farmworker high evaluated food security). For farmworkers earning a modest income, the added burden of remittances contributed to their financial precarity and the resultant worries about food access. The structural vulnerabilities related to immigration enforcement in farming communities were another source of stress. One farmworker with marginal evaluated food security shared how changes to immigration policy and heightened enforcement affected their capacity to work: “At work, they’ve told us they’re going to check the [social security numbers] this coming year. Thank God, we have [social security numbers], but those who don’t? They let them go.” (50-year-old Hispanic/Latinx female). Connected with these fears of deportation that reduced farmworkers’ capacity to work, fewer individuals were available to maintain basic farm functions, affecting the farm owners. One farm owner explained the essential role farmworkers play on the farm: “We can grow the fruit, and it can sit on the trees. But unless we have people to prune, or thin, or pick, or do all the jobs we need to do, it’s just gonna sit on the trees. It’s gonna be a waste.” (35-year-old Asian female with high evaluated food security). Fewer farmworkers active in the farm workforce affects farm maintenance and farm profits. Diminished farm profits harm farm owners and subsequently farmworkers, whose well-being is

contingent upon productivity, work, and a successful harvest. Farm owners need farmworkers to generate more profit from the farm business, while also requiring pay. The problems with immigration experienced by both groups, farmworkers and farm owners, highlights how structural racism and classism embedded into the food system may overshadow worries related to food access, while related reductions in income affect food access.

For farmworkers living in rural areas earning low wages, preoccupations with access to food may be heightened. One farmworker with marginal evaluated food security explained how low wages combined with higher food costs in the rural setting affected her ability to access food: “There is very little work, sometimes, [and] things are very expensive. I think it affects me that sometimes, I can’t take enough food home due to food being too expensive.” (38-year-old Hispanic/Latinx female). While farm owners determine their own pay, many (n=8) reported that they also struggle with the cost of food locally. Some farm owners also expressed the desire to pay farmworkers more livable wages but struggled to support themselves: “We would love to pay more, but we did the math and that’s about what we pay ourselves.” (36-year-old White female farm owner). Farmworkers who earn low wages may also have trouble making ends meet in other ways. Another farmworker with high evaluated food security described how she struggled with paying for necessary medical treatment: “I stretch [my income] a little bit so I can make ends meet. Sometimes [it] feel[s] like a nightmare because I do not have enough money to cover my expenses because I [have to] take a lot of medicine.” She followed this statement by explaining why she doesn’t worry about food access: “Sometimes we see difficult times, but saying that we don’t have [food in the home], that we *don’t have?* No.” (73-year-old Hispanic/Latinx female). For this farmworker, preoccupations with the costs of prescriptions may have overshadowed worries about food access. Her feelings also demonstrate how experiences of FI are possibly conflated with experiences of hunger among those who must prioritize their basic needs. Without the physical experience of hunger, food concerns may be set aside.

Psychological fatigue from co-occurring stressors grounded participants’ tendency to minimize the emotional toll from their experiences: “If you’ve been farming for a while, you get used to handling failure.” (56-year-old White female farm owner with marginal evaluated food security). Participants minimized the importance and impact of their experiences and

resigned themselves to their conditions. For example, one farmworker with low evaluated food security acknowledged his family's FI but was quick to shift his narrative to minimize the experience of suffering that FI caused.

Sometimes we don't have enough money to buy the [food] that we want. But we are used to suffering, and it doesn't matter. We are used to eating beans and tortillas, and that is something. And my entire family is used to that. We don't suffer, and we don't worry about that too much. (65-year-old Hispanic/Latinx male)

Provided this mindset, even acknowledged experiences of FI might prompt farm owners and farmworkers to respond to the USDA HFSSM in ways that reflect their behaviors and beliefs around FI but may not necessarily reflect their circumstances. Due to this disconnect, food security policies and programs that require beneficiaries to apply for assistance will miss those who would benefit from food assistance but do not seek it.

Alienation Subjective social status (social comparisons) framed a state of alienation experienced by farm owners and farmworkers. Alienation, as characterized in FI, reflects the tension between a household's actual control over their food and the degree of control they think they should have (Hamelin et al. 2002). Among participants, such perceptions of control were socially informed through relative comparisons. Subjective social status refers to one's appraised position within the social hierarchy relative to the social status of a comparator (Jackman and Jackman 1973). Applied to farm owners and farmworkers, comparisons between their social positions and circumstances (the control they do have) and the social position and circumstances of others (the comparative control they think they should have) influenced their experiences of alienation. We see the role of positionality and how it affects farm owners' and farmworkers' frames through which they view experiences with FI. For example, one 40-year-old White female farm owner with low evaluated food security compared her circumstances to what she believed her advantages should be provided the low level of structural barriers keeping her down.

I'm, like, a 40-year-old, well-educated, White woman in the United States, and I look at [those factors], and I'm like, there's not a lot keeping me down. I think, in my ideal world, I'd have a little bit more to spend on food, but I don't, so I end up being like, well, whatever. We're eating rice and beans tonight.

By selecting a demographically similar group to inform her interpretations of social position, she experienced feelings of alienation (a low level of actual control versus a high level of expected control) intertwined with the resignation that her current circumstances could be worse.

One 44-year-old Hispanic/Latinx female farmworker with low evaluated food security formed her subjective social status with comparisons to individuals with greater need, which influenced her use of informal food safety net resources like food banks:

I would never go to a [food bank] to get food when I still have some beans left. I say, "at least I have beans, tortillas, and cheese, and I can have those." But that is my way of thinking, that [food banks] are for people who really don't have anything to eat.

Selecting a worse-off group to inform her perceptions of FI minimized her state of alienation (low level of actual control versus the potential for a lower level of control) and consequently the difficulty of her own experiences. Unwillingness to identify with high levels of need may also be rooted in the virtues of self-reliance and associations of social position with the ability to provide for oneself. As a result, she was hesitant to use the resources available that may help her manage FI.

Comparisons of subjective social status relative to past social status and experiences of FI influenced appraisals of current FI. Participants described past experiences in which they encountered food shortages that were comparably worse than the seasonal hardships they experienced in their current circumstances. This was especially salient for farmworkers, many of whom endured worse conditions in their country of origin or upon arrival in the U.S. A 65-year-old Hispanic/Latinx male farmworker with low evaluated food security described his experiences before immigration to the U.S.:

Our situation in Mexico was precarious. We were poor. We suffered a lot more due to a lack of food. What can I tell you? You can't have [all] of the things that you want. My situation is not that serious.

Drawing on difficult experiences as a baseline for his current subjective social status and experiences with FI, he regarded his current food situation as an improvement. Like the selection of a worse-off comparator, he minimized his sense of alienation (low level of actual control versus previously experienced lower control).

While participants themselves did not experience alienation of their identity, the alienation identified by Hamelin's conceptual framework refers to the separation between the

food status participants believe they should have, and their actual food situation. As such, food producers with proximity to food, like farmworkers and farm owners, may believe they have more control over their food than they experience. These relational views of FI provide further insight into how participants respond to the USDA HFSSM: in ways they believe someone in their position should answer.

A Lack of Control Participants maintained control over their food availability primarily through labor. “It’s something that we all know. We have to work in order to eat. If you don’t work – it’s a normal thing [to not have food].” (45-year-old Hispanic/Latinx male farmworker with low evaluated food security). His comments reveal the intersection between work and control, a viewpoint this farmworker believed was widely accepted. Work provided farm owners and farmworkers power over their circumstances. When asked if his food sources were enough to cover his needs, one 72-year-old Hispanic/Latinx male farmworker with low evaluated food security explained the role his ability to work played:

Well yes! More or less, we get by. Sometimes, you barely get enough [income] for food [and] for one’s expenses, like bills. It’s a lot. Sometimes life is hard, but then being able to work, having work, everything is fine.

When work was unavailable like during the winter, farm owners and farmworkers experienced a lack of control over their food shortages due to the subsequent loss of income. One participant shared, “In the winter, work gets scarce, and you work less hours, it’s more difficult to get food.” (30-year-old Hispanic/Latinx male farmworker with high evaluated food security). To regain control, many participants coped with their FI by taking on additional work. For farmworkers, this was often extra work in agriculture or construction. One farmworker with low evaluated food security said, “I go out to the field to work a day or two someplace [else] where they have work [available].” (72-year-old Hispanic/Latinx male). Meanwhile, additional work for farm owners meant engaging in the non-farm workforce. A 35-year-old White male farm owner and small business owner with high evaluated food security explained, “Being a small farmer on its own is hard enough, and if you don’t have another source of income, it can be pretty tough [to afford food].”

Sixty-eight percent of participants worked six to seven days per week during the agriculturally productive seasons, frequently at multiple jobs and typically exceeding a 40-hour work week. This intensive engagement in the workforce was often necessary to ensure that participants had access to enough food. For example, a 40-year-old White female farm owner with low evaluated food security shared her frustrations with the amount of work demanded for her family to have enough food:

Why are we [living] paycheck to paycheck? We work so hard. My husband, his typical work week is 70 hours. I’m not exaggerating. I’m also working and dragging my kids with me. Our biggest expense, hands down, is food.

Her exasperation demonstrated the feelings of powerlessness experienced by overworked farm owners and farmworkers, who perceived an insufficient return (income, food) on their investments (the time and energy dedicated to working).

Hiding Food Insecurity The desire to hide FI relates to the concealment of alienation, a lack of control, or disempowerment. Feelings of embarrassment regarding a lack of control over food often grounded rationale for the use or non-use of food assistance resources. Participants valued assistance that granted them privacy and independence, which protects them from judgment. One farmworker with low evaluated food security shared his concerns of judgment from his community, saying, “Do not go knocking on so-and-so’s house. ‘Hey (knocks on table) Give me money to go buy tortillas or bread, chicken, beans...’ And that friend will say, ‘That lazy [person] doesn’t work’.” (56-year-old Hispanic/Latinx male). Farm owners and farmworkers view work as a way to control their FI by picking up more hours or even overworking, which lends to the viewpoint that those who cannot control their experiences with FI must be too lazy to work harder. While informal food assistance, like food banks and charitable food distributions, were essential resources for both farm owners and farmworkers, their highly visible and community-based nature made it difficult for participants to use them in privacy.

We’ve thought about [utilizing the food bank]. But I guess there is still some pride [preventing us]. We

don't want neighbors seeing us going in. Other people at our church use it, and some help in there, too. I don't know. We just haven't felt comfortable about that source. Everybody draws lines, I'm sure, as to what they will and won't do (75-year-old White male farm owner with high evaluated food security).

Some farm owners contributed produce to their local food banks, which complicated their decision to use the food bank when they didn't have enough food. One female farm owner with low evaluated food security shared her feelings as a contributor and customer of her local food bank. She said, "It's kind of embarrassing. One year, you're dropping stuff off for them, and then the next year, you're asking for help." (63-year-old White female farm owner).

Discussion

While the farm workforce dedicates their labor and livelihoods to grow our food, farmworkers and farm owners often struggle to put food on their own tables. Corporate consolidation and the concentration of power in the food system have ensured that food in the U.S. continues to become less and less available or affordable for consumers while lowering the prices paid to farm businesses. The systematic issues that limit farmworkers' access to food and the structural vulnerability produced by an unjust food system have been documented by others (Brown and Getz 2020; Kilanowski and Moore 2010; Mares 2019; Minkoff-Zern 2014; Wirth et al. 2007), yet the vulnerability of farm owners and their relation to farmworkers' FI has never been addressed in the literature. Results of this study offer an understanding of the experiences of FI among farm owners and farmworkers in Oregon. According to initial analysis using USDA 6-Item HFSSM scores, 17 participants had high food security, 3 had marginal food security, and 11 had low food security. Ensuing qualitative analyses using Hamelin et al.'s conceptual framework (2002) revealed the characteristic experiences of FI on the farm (Table 3) that revolved around seasonal resource shortages resulting in food shortages at some point during the year, strategies to stretch resources to support farm households year-round, and the tendency to downplay hardship. From the perspectives of many farm owners and farmworkers, they always had *something to eat*. Research with small farm owners and farmworkers has approached the two communities as separate entities despite interconnected vulnerabilities (Berkey and Schusler 2016; Villarejo 2012). The results of this study suggest that the two groups also share many of the same

characteristics of FI and structural vulnerabilities (Table 4). To the authors' knowledge, this is the first time that experiences with FI have been documented among the published literature for small farm owners in the U.S., and the first time they have been examined parallel to the experiences of farmworkers. Considering the lived experiences of farm owners and farmworkers together addresses the sources of structural inequity experienced by farmworkers in recognition of the power farm owners hold over the health and well-being of workers. Further, this research responds to the call for policies intended to address the health and well-being of farm owners and farmworkers while remaining sensitive to the nature of life on the farm (American Public Health Association 2017; Braun 2019). Findings provide a more comprehensive understanding of the difficulties encountered by the farm workforce to help inform more responsive policies and programs.

The HFSSM is a trusted tool that researchers have used to measure FI among farmworkers previously (Allen 2008; Borre et al. 2010; Brown and Getz 2020; Minkoff-Zern 2014; United States Department of Agriculture 2012). Findings from this current study revealed evaluated food security scores that were sometimes misaligned with farm owner and farmworker narrative experiences. One explanation is that the HFSSM was less sensitive to the moderate and variable cases of FI common among our sample, which is consistent with research that shows the HFSSM to be sensitive toward more severe cases of FI, but less sensitive to inconsistent experiences of FI (Johnson et al. 2020). A second explanation is that participant responses to the six-question survey were subject to farm owner and farmworker interpretations of the words, questions, and concepts intended to be captured. Because this study sample included farm owners and farmworkers from varying ethnic and cultural contexts, the embodied experiences of food adequacy, fullness, and nourishment (Napier et al. 2014), likely differed from the technical definitions of FI that the HFSSM is designed to capture. A third explanation is that the HFSSM cannot capture and reflect the unique circumstances encountered by the farm workforce. These explanations are not mutually exclusive, and each may play some part in the misalignment between HFSSM measures and the participants' narrative experiences. As such, the use of measures that more comprehensively capture the lived experiences of FI helped clarify the role of FI among farm owners and farmworkers.

One of the most salient characteristics of farm owner and farmworker FI using the Hamelin framework was the seasonal resource shortages that resulted in a lack of food, particularly during the winter months that fall in between growing seasons. This finding complements research identifying the increased prevalence of winter hunger among farmworkers (Wirth et al. 2007). Further, it is consistent

with studies documenting seasonal food shortages among farming households in low-income countries (Devereux and Tavener-Smith 2019; Hirvonen et al. 2016). Provided the seasonality of farm work, experiences of FI among farm owners and farmworkers are likely to rise during the winter and fall during the summer. As these experiences are inconsistent, farm owners and farmworkers may be less likely to seek assistance when they foresee a solution to their food struggles in the future. In consideration of evidence of seasonal FI, the time of year that FS was evaluated with the HFSSM and the Hamelin framework may have changed how individuals responded to survey questions, which could explain some differences between evaluated and experienced FI. Interviews for this study were conducted during the agricultural off-seasons, as farm owners and farmworkers had more time available to meet with the researchers on this study. Results reflect experiences during a period when food shortages were more common.

Participants primarily maintained control over their food situation by picking up more work. Farm owners and farmworkers were tasked with stretching their notoriously low wages (Hernandez and Gabbard 2018; Berkey and Schusler 2016) to make them last. Like Meierotto and Som Castellano's study on Latinx farmworkers in Idaho (2020), participants in this study worked long hours almost every day of the week to generate sufficient income to support their current food needs and save for the winter. Consistent with the literature describing values of self-reliance and a sense of shame associated with the use of food assistance resources among rural populations (Andress and Fitch 2016), participants grappled with their use of food assistance and preferred to use programs with discretion within their small farming communities. Participants also engaged in financial management strategies like those documented by Quandt et al.'s (2004) research on farmworkers in North Carolina. Consistent with Quandt's findings, farm owners and farmworkers sustained themselves through the winter by budgeting to save money and reduce food variety. While dietary variety is an indicator of a nutritionally adequate diet (Drewnowski et al. 1997), participants emphasized the importance of the key staple foods that provided them with *something to eat* and protected them from hunger.

Not all characteristics of FI were shared between the two groups (farm owners and farmworkers), as some factors affected farm owners differently than they affected farmworkers and vice versa (Table 4). Farm owners leaned on formal debts, such as lines of credit, to get them through the winter. Farm owners' credit supported living expenses, including access to food and the purchase of agricultural inputs to run their farms, which are standard practices among U.S. farm owners (Harvie 2017). Separately, informal loans from family, friends, and employers supported farmworkers

in the winter months. One explanation for these differences is that formal lines of credit may be available to farm owners with established credit but not farmworkers, many of whom face immigration-related barriers to establishing credit. Access to collateral may also hinder farmworker access to formal credit. While all farmworkers were residing in community housing on the farm or in nearby rented apartments, most ($n = 11$) farm owners owned the land they were cultivating. Studies among undocumented immigrants suggest hesitancy towards engaging with financial institutions. Though some financial institutions will grant lines of credit to those with little to no established credit score, these debts likely entail high-interest rates that can make paying them off more difficult (Martin 2015). For farmworkers who were faced with the choice to buy food or pay utility bills, the decision to buy food instead of paying an electricity bill could harm their credit. The inability to make bill payments further reduced opportunities to participate in the U.S. economy fully.

Study participants' concerns about food accompanied a host of risks and stressors that farming communities experience (Braun 2019). Overburdened and overworked farm owners and farmworkers are vulnerable to psychological fatigue (Garaika 2019), characterized by a diminution of the attitudinal, emotional, and spiritual elements of one's skills, contributions, and outputs (Pritchard and Eliot 2012). The current study found that farm owners and farmworkers minimized the severity and difficulty of their FI through suggestions that their experiences were quotidian and inconsequential. Ultimately, many participants downplayed their circumstances. Similar cognitive processes have been identified among other food insecure populations (Dryland et al. 2020; Hamelin et al. 2002).

Implications

Findings from this study demonstrate the benefits offered by pairing two measures to capture FI among farm owners and farmworkers comprehensively. Still, the measures, the USDA HFSSM and the Hamelin framework, capture experiences of FI that are specific to static technical definitions of FI and may not represent the dynamic perspectives of farm owners and farmworkers. Misalignment between objective and subjective experiences of FI may lead to policies and programs that do not reflect the attitudes of the target population. Although farm owners and farmworkers have experiences of FI similar to other low-income and immigrant groups (De Marco et al. 2009; Munger et al. 2015; Quandt et al. 2006), their experience is rooted in the unique elements specific to the structural inequities dominant within the food system. Seasonal differences, resource stretching, overworking, downplaying the severity of needs, and reluctance

to seek assistance should be considered when planning interventions and outreach to support farm communities. Education campaigns may be more effective if they identify the lived experiences of FI, like resource stretching, seasonal deprivation, and limiting dietary diversity, as FI, i.e. you don't have to be hungry to be food insecure. Further, it may be beneficial to identify and engage the voices of key community stakeholders in policy and program development. Future studies on FI among farm owners and farmworkers may benefit from an investigation into the variations in interpretation and understanding of FI and HFSSM survey items and Hamelin et al.'s core characteristics.

The experiences of FI among farm owners and farmworkers can also inform programs and policies to support a more robust, just, food system. Most farmworkers and small farm owners experienced distinct seasonal food shortages but were cautious about the types of food assistance they sought and utilized. Policies and programs could be designed to provide standardized seasonal wages or resource supplements for the farm workforce. U.S. farm owners are known to value self-reliance and independence, and they are unlikely to ask for assistance (Farm Aid 2018), further it can be difficult to provide proof of employment to meet program work requirements like those used for the Supplemental Nutrition Assistance Program (SNAP) for self-employed farm owners. Farmworkers find themselves ineligible for and/or hesitant to utilize federal food assistance programs like SNAP, despite the potential for these programs to improve racial health disparities encountered by farmworkers (Rockler et al. 2022). Thus, automatic program enrollment for all agricultural workers could obviate the need for farm owners and farmworkers to prove eligibility and apply for assistance. Additionally, providing a standardized payment for all agricultural workers would support rural farm economies by increasing the food purchasing power of farming families. Like work requirements, current farm subsidies disincentivize farm owners from earning revenue above a certain limit. Less centralized approaches have been proposed as possible solutions to address food system inequity and environmentally sound farming practices including social contracts between farmer and non-farmer (Graddy-Lovelace 2021) and parity pricing (Patel and Goodman 2019). Other solutions include financial institutions and fair financing options accessible to farmworkers to help establish and build credit and support during the agricultural off-season. The feasibility and effectiveness of such programs on experiences of FI among farm owners and farmworkers warrant further exploration.

Longer-term solutions demand improvements to economic conditions among vulnerable farm owners and farmworkers. Addressing persistent poverty among farming communities requires substantial economic, social, and infrastructural

changes in the food system. While labor law exemptions granted to the agricultural industry need to be re-examined for farmworker well-being, namely those related to piece systems and overtime pay, a food systems approach must also consider the role of the farm owners' precarity in relation to the farmworker. Further, the allocation of more substantial resources is necessary to strengthen the market infrastructure that supports the profitability of small farms. Research and evidence-based policies should be grounded in mixed-methods approaches that can capture the full breadth of the vulnerabilities faced by farming communities and identify opportunities for justice within the food system.

Limitations

This study had several limitations. First, most farm owners in the study sample were White, and all farmworkers were Hispanic/Latinx. While a majority of farm owners in Oregon are White, this research needs to be advanced by studying a sample of the farm workforce with broader diversity to understand the influence of demographic diversity on FI, particularly in recognition of a food system built upon racism and classism. Also, the interviewers were two White women and one Puerto Rican Latina woman connected with a public health program at a large public university. None of the interviewers worked on a farm, which may have impacted the information participants elected to share. Differences in race, ethnicity, education, citizenship, social class, and other perspectives and experiences between the interviewers and study participants may have influenced the direction and depth of each interview. Further, one of the interview sites took place on an orchard where the employer was present, which may have limited the candid experiences of some farmworker participants.

The sample included farmworkers and small farm owners in Oregon, limiting the transferability of these findings to other groups in other regions among the farm workforce. Additionally, interviews were conducted before the COVID-19 pandemic, which had significant social, economic, and health impacts on the farm workforce, thus limiting the transferability of these findings to post-COVID farm conditions. Provided the importance of work to support the livelihoods of farm owners and farmworkers, their position as essential workers during the global pandemic allowed them to continue to earn an income during the economic recession. Still, farm owner and farmworker conditions on the farm and in housing put them at high risk of contracting and transmitting COVID-19. In addition, farm owners and farmworkers who experience COVID-19 symptoms may encounter barriers to accessing healthcare for testing, contact tracing, and quarantining guidelines. Farm owners and farmworkers who encounter stigma related to a culture of hard work and independence that demand engagement in the workforce also faced stigma as a community that

continued to labor during the pandemic, thus potentially contributing to the spread of COVID-19 (Bottemiller Evich et al. 2020). Future research is needed to understand farm owner and farmworker experiences of FI after the COVID-19 pandemic.

Conclusion

Our study sought to better understand the experiences of FI among the farm workforce in Oregon. We found evidence that farm owner and farmworker perspectives of their lived experiences with FI often misaligned with evaluated food security status and characterizations of FI. While this may signal that the tools we use to measure FI among farm owners and farmworkers are more sensitive to the experiences of FI than those who encounter them, both measured FI and perspectives of FI provide valuable information. Measured food security and core characteristics of FI connected to farm livelihoods underscore the need for farm policies and programs designed to address FI in consideration of the unique contextual, structural factors that contribute to limited food access, including seasonal gaps in income, low wages, over-working, downplayed experiences of hardship, and limited use of food assistance. Further, farm owner and farmworker perspectives of FI highlight the importance of community engagement in developing policies and programs intended to serve farming communities.

Authors' contributions The corresponding author conceptualized and designed the study and formulated research questions as part of her dissertation work. They coded the dataset, completed data analysis, interpreted results, wrote the first draft of the manuscript, and undertook major revisions. The second and third authors contributed to the interpretation of research findings and provided substantial revisions on multiple drafts of the manuscript. The fourth and fifth authors provided review and editing of the manuscript.

Funding Financial support for this study was received from the corresponding University with which the authors are affiliated.

Declarations

Competing interests The authors have no competing interests to declare that are relevant to the content of this article.

Ethics Approval Approval was obtained from the ethics committee of the corresponding University's Institutional Review Board. The procedures used in this study adhere to the tenets of the Declaration of Helsinki.

Consent to participate and consent to publish Informed consent to participate, including publication of research derived from their data, was obtained from all individual participants included in the study.

References

- Agee, J. 2009. Developing qualitative research questions: a reflective process. *International Journal of Qualitative Studies in Education*. <https://doi.org/10.1080/09518390902736512>.
- Allen, P. 2008. Mining for justice in the food system: perceptions, practices, and possibilities. *Agriculture and Human Values*. <https://doi.org/10.1007/s10460-008-9120-6>.
- American Public Health Association. 2017. Improving working conditions for U.S. farmworkers and food production workers. APHA Policy Statement Database. <https://www.apha.org/policies-and-advocacy/public-health-policy-statements/policy-database/2018/01/18/improving-working-conditions>. Accessed 10 November 2022.
- Andress, L., and C. Fitch. 2016. Juggling the five dimensions of food access: perceptions of rural low income residents. *Appetite*. <https://doi.org/10.1016/j.appet.2016.05.013>.
- Arcury, T. A., and A. J. Marin. 2009. Latino/hispanic farmworkers and farm work in the Eastern United States: the context for health, safety, and justice. In *Latino farmworkers in the Eastern United States: Health, safety and justice*, eds. S. Quandt, and T. A. Arcury, 15–36. New York, NY: Springer. https://doi.org/10.1007/978-0-387-88347-2_2.
- Berkey, R. 2014. Just farming: An environmental justice perspective on the capacity of grassroots organizations to support the rights of organic farmers and laborers. PhD dissertation, Department of Environmental Studies. Keene, NH: Atioch University.
- Berkey, R., and T. Schusler. 2016. Justice issues facing family-scale farmers and their laborers in the northeastern United States. *Journal of Agriculture Food Systems and Community Development*. <https://doi.org/10.5304/jafscd.2016.062.017>.
- Blumberg, S. J., K. Bialostosky, W. Hamilton, and R. R. Briefel. 1999. The effectiveness of a short form of the household food security scale. *American Journal of Public Health*. <https://doi.org/10.2105/ajph.89.8.1231>.
- Borre, K., L. Ertle, and M. Graff. 2010. Working to eat: vulnerability, food insecurity, and obesity among migrant and seasonal farmworker families. *American Journal of Industrial Medicine*. <https://doi.org/10.1002/ajim.20836>.
- Bottemiller Evich, H., X. Bustillo, and L. Crampton. 2020. Harvest of shame: Farmworkers face coronavirus disaster. Politico. <https://www.politico.com/news/2020/09/08/farmworkers-coronavirus-disaster-409339>. Accessed 10 November 2022.
- Braun, B. 2019. Farm family stressors: Private problems. National Council on Family Relations. <https://www.ncfr.org/resources/research-and-policy-briefs/farm-family-stressors-private-problems-public-issue>. Accessed 10 November 2022.
- Brotherson, S. 2016. Farming/ranching: Stressful occupations. North Dakota State University. <https://www.ag.ndsu.edu/publications/kids-family/farming-ranching-stressful-occupations/>. Accessed 10 November 2022.
- Brown, S., and C. Getz. 2020. Farmworker food insecurity and the production of hunger in California. In *Cultivating food justice*, eds. A. H. Alkon, and J. Agyeman, 121–146. Cambridge, MA: MIT Press. <https://doi.org/10.7551/mitpress/8922.003.0010>.
- Brumby, S. A., S. J. Willder, and J. Martin. 2009. The sustainable farm families project: changing attitudes to health. *Rural and Remote Health*. <https://doi.org/10.22605/rrh1012>.
- Charmaz, K. 2004. Premises, principles, and practices in qualitative research: revisiting the foundations. *Qualitative Health Research*. <https://doi.org/10.1177/1049732304266795>.
- Coates, J., P. Webb, and R. Houser. 2003. Measuring household food insecurity: why it's so important and yet so difficult to do. *The Journal of Nutrition*. <https://doi.org/10.1093/jn/136.5.1404S>.

- Creswell, J. W., W. E. Hanson, V. L. Clark Plano, and A. Morales. 2007. Qualitative research designs: selection and implementation. *The Counseling Psychologist*. <https://doi.org/10.1177/0011000006287390>.
- De Marco, M., S. Thorburn, and J. Kue. 2009. In a country as affluent as America, people should be eating: experiences with and perceptions of food insecurity among rural and urban Oregonians. *Qualitative Health Research*. <https://doi.org/10.1177/1049732309338868>.
- Devereux, S., and L. Tavener-Smith. 2019. Seasonal food insecurity among farm workers in the Northern Cape, South Africa. *Nutrients*. <https://doi.org/10.3390/nu11071535>.
- Dewitt, E., R. Gillespie, H. Norman-Burgdolf, K. M. Cardarelli, S. Slone, and A. Gustafson. 2020. Rural SNAP participants and food insecurity: how can communities leverage resources to meet the growing food insecurity status of rural and low-income residents? *International Journal of Environmental Research and Public Health*. <https://doi.org/10.3390/ijerph17176037>.
- Drewnowski, A., S. A. Henderson, A. Driscoll, and B. J. Rolls. 1997. The dietary variety score: assessing diet quality in healthy young and older adults. *Journal of the American Dietetic Association*. [https://doi.org/10.1016/S0002-8223\(97\)00070-9](https://doi.org/10.1016/S0002-8223(97)00070-9).
- Dryland, R., J. A. Carroll, and D. Gallegos. 2020. Moving beyond coping to resilient pragmatism in food insecure households. *Journal of Poverty*. <https://doi.org/10.1080/10875549.2020.1799287>.
- Farm Aid. 2018. Why farmers face unique threats from stress. Farm Aid Blog. <https://www.farmaid.org/blog/fact-sheet/why-farmers-face-unique-threats-from-stress/>. Accessed 10 November 2022.
- Garaika. 2019. The Effects of Fatigue, Role Overload and Stress on Farmer's Work Safety. In *Proceedings of the 2nd international conference on inclusive business in the changing world - ICIB*, 13–17. Jakarta, Indonesia. <https://doi.org/10.5220/0008427000130017>.
- Graddy-Lovelace, G. 2021. Farmer and non-farmer responsibility to each other: negotiating the social contracts and public good of agriculture. *Journal of Rural Studies*. <https://doi.org/10.1016/j.jrurstud.2020.08.044>.
- Gross, J., and N. Rosenberger. 2005. Food insecurity in rural Benton county: An ethnographic study. Oregon State University. https://ir.library.oregonstate.edu/concern/technical_reports/ff365949n. Accessed 10 November 2022.
- Hadley, C., and D. L. Crooks. 2012. Coping and the biosocial consequences of food insecurity in the 21st century. *Yearbook of Physical Anthropology*. <https://doi.org/10.1002/ajpa.22161>.
- Hamelin, A. M., M. Beaudry, and J. P. Habicht. 2002. Characterization of household food insecurity in Québec: Food and feelings. *Social Science and Medicine*. [https://doi.org/10.1016/S0277-9536\(01\)00013-2](https://doi.org/10.1016/S0277-9536(01)00013-2).
- Harvie, A. 2017. A looming crisis on American farms. Farm Aid. <https://www.farmaid.org/issues/farm-economy-in-crisis/looming-crisis-american-farms/>. Accessed 10 November 2022.
- Health Resources and Services Administration. 2019a. Rural health information hub: Rural health disparities. <https://www.ruralhealthinfo.org/topics/rural-health-disparities>. Accessed 10 November 2022.
- Health Resources and Services Administration. 2019b. Rural health information hub: Rural response to farmer mental health and suicide prevention introduction. <https://www.ruralhealthinfo.org/topics/farmer-mental-health>. Accessed 10 November 2022.
- Hernandez, T., and S. Gabbard. 2018. Findings from the National Agricultural Workers Survey (NAWS) 2015–2016: A demographic and employment profile of United States farmworkers research report No. 13. JBS International. https://www.dol.gov/sites/dolgov/files/ETA/naws/pdfs/NAWS_Research_Report_13.pdf. Accessed 10 November 2022.
- Hill, B. G., A. G. Moloney, T. Mize, T. Himelick, and J. L. Guest. 2011. Prevalence and predictors of food insecurity in migrant farmworkers in Georgia. *American Journal of Public Health*. <https://doi.org/10.2105/AJPH.2010.199703>.
- Hirvonen, K., A. S. Taffesse, and I. Worku Hassen. 2016. Seasonality and household diets in Ethiopia. *Public Health Nutrition*. <https://doi.org/10.1017/S1368980015003237>.
- Ip, E. H., S. Saldana, T. A. Arcury, J. G. Grzywacz, G. Trejo, and S. A. Quandt. 2015. Profiles of food security for US farmworker households and factors related to dynamic of change. *American Journal of Public Health*. <https://doi.org/10.2105/AJPH.2015.302752>.
- Isserman, A. M., E. Feser, and D. E. Warren. 2009. Why some rural places prosper and others do not. *International Regional Science Review*. <https://doi.org/10.1177/0160017609336090>.
- Jackman, M., and R. Jackman. 1973. An interpretation of the relation between objective and subjective social status. *American Sociological Review*. <https://doi.org/10.2307/2094408>.
- Johnson, C. M., A. S. Ammerman, L. S. Adair, A. E. Aiello, V. L. Flax, S. Elliott, ... S. K. Bowen. 2020. The Four Domain Food Insecurity Scale (4D-FIS): development and evaluation of a complementary food insecurity measure. *Translational Behavioral Medicine*. <https://doi.org/10.1093/tbm/ibaa125>.
- Kandel, W. 2008. Profile of hired farmworkers, A 2008 update. United States Department of Agriculture. <https://www.ers.usda.gov/publications/pub-details/?pubid=4604>. Accessed 10 November 2022.
- Ketterman, J., B. Braun, and M. Pippidis. 2021. Extension programming resource for building farm and farm family resilience. *Journal of Extension*. <https://tigerprints.clemson.edu/joe/vol58/iss5/4>.
- Kiehne, E., and N. S. Mendoza. 2015. Migrant and seasonal farmworker food insecurity: prevalence, impact, risk factors, and coping strategies. *Social Work in Public Health*. <https://doi.org/10.1080/19371918.2015.1019173>.
- Kilanowski, J. F., and L. C. Moore. 2010. Food security and dietary intake in midwest migrant farmworker children. *Journal of Pediatric Nursing*. <https://doi.org/10.1016/j.pedn.2009.04.008>.
- Korstjens, I., and A. Moser. 2018. Series: practical guidance to qualitative research. Part 4: trustworthiness and publishing. *European Journal of General Practice*. <https://doi.org/10.1080/13814788.2017.1375092>.
- Krefting, L. 1991. Rigor in qualitative research: the assessment of trustworthiness. *The American Journal of Occupational Therapy* 45 (3): 214–222.
- Mares, T. M. 2019. More than money: extending the meanings and methodologies for farmworker food security. Life on the other side of the border: farmworkers and food justice in Vermont, 55–84. Oakland, CA: University of California Press. <https://doi.org/10.1525/9780520968394-005>.
- Martin, N. 2015. Giving credit where credit is due: what we can learn from the banking and credit habits of undocumented immigrants. 2015 Michigan State Law Review 989–1042.
- Maynard, M., J. Dean, P. I. Rodriguez, G. Sriranganathan, M. Qutub, and S. I. Kirkpatrick. 2019. The experience of food insecurity among immigrants: a scoping review. *Journal of International Migration and Integration*. <https://doi.org/10.1007/s12134-018-0613-x>.
- Meierotto, L., and R. Som Castellano. 2020. Food provisioning strategies among Latinx farm workers in southwestern Idaho. *Agriculture and Human Values*. <https://doi.org/10.1007/s10460-019-09959-6>.
- Minkoff-Zern, L. A. 2014. Knowing “Good Food”: immigrant knowledge and the racial politics of farmworker food insecurity. *Antipode*. <https://doi.org/10.1111/anti.1016>.
- Munger, A. L., T. D. S. Lloyd, K. E. Speirs, K. C. Riera, and S. K. Grutzmacher. 2015. More than just not enough: experiences of food insecurity for latino immigrants. *Journal of Immigrant and Minority Health*. <https://doi.org/10.1007/s10903-014-0124-6>.
- Murphy, S. P., J. A. Foote, L. R. Wilkens, P. P. Basiotis, A. Carlson, K. K. L. White, and K. M. Yonemori. 2006. Simple measures

- of dietary variety are associated with improved dietary quality. *Journal of the American Dietetic Association*. <https://doi.org/10.1016/j.jada.2005.12.003>.
- Napier, A. D., C. Ancarno, B. Butler, J. Calabrese, A. Chater, H. Chatterjee, F. Guesnet, R. Horne, S. Jacyna, S. Jadhav, A. Macdonald, U. Neuendorf, A. Parkhurst, R. Reynolds, G. Scambler, S. Shamdasani, S. Z. Smith, J. Stougaard-Nielsen, L. Thomson, N. Tyler, ...K. Woolf. 2014. Culture and health. *Lancet*. [https://doi.org/10.1016/S0140-6736\(14\)61603-2](https://doi.org/10.1016/S0140-6736(14)61603-2).
- Patel, R., and J. Goodman. 2019. A new green deal for agriculture. *Jacobin*. <https://jacobin.com/2019/04/green-new-deal-agriculture-farm-workers>. Accessed 10 November 2022.
- Patton, M. Q. 2002. Two decades of developments in qualitative inquiry. *Qualitative Social Work: Research and Practice*. <https://doi.org/10.1177/1473325002001003636>.
- Perez-Escamilla, R., and A. M. Segall-Correa. 2008. Food insecurity measurement and indicators. *Revista de Nutricao* 21 (Suppl.): 15s–26s.
- Pritchard, K., and J. Eliot. 2012. *Help the helper: building a culture of extreme teamwork*. New York: Penguin Group.
- Quandt, S. A., T. A. Arcury, J. Early, J. Tapia, and J. D. Davis. 2004. Household food security among migrant and seasonal latino farmworkers in North Carolina. *Public Health Reports*. <https://doi.org/10.1016/j.phr.2004.09.006>.
- Quandt, S. A., J. G. Grzywacz, A. Marin, L. Carrillo, M. L. Coates, B. Burke, and T. A. Arcury. 2006. Illnesses and injuries reported by latino poultry workers in western North Carolina. *American Journal of Industrial Medicine*. <https://doi.org/10.1002/ajim.20299>.
- Radimer, K. L., C. M. Olson, and C. C. Campbell. 1990. Development of indicators to assess hunger. *Journal of Nutrition*. https://doi.org/10.1093/jn/120.suppl_11.1544.
- Ready, E. 2016. Challenges in the assessment of Inuit food security. *Arctic*. <http://www.jstor.org/stable/24877929>.
- Rissing, A., S. Inwood, and E. Stengel. 2020. The invisible labor and multidimensional impacts of negotiating childcare on farms. *Agriculture and Human Values*. <https://doi.org/10.1007/s10460-020-10162-1>.
- Rockler, B. E., S. K. Grutzmacher, J. Garcia, and E. Smit. 2022. The role of SNAP and WIC participation and racialized legal status in U.S. farmworker health. *PloS one*. <https://doi.org/10.1371/journal.pone.0272911>.
- Saldaña, J. 2016. *The coding manual for qualitative researchers*. 3rd ed. Newbury Park, CA: SAGE Publications Ltd.
- Sano, Y., S. Garasky, K. A. Greder, C. C. Cook, and D. E. Browder. 2011. Understanding food insecurity among latino immigrant families in rural America. *Journal of Family and Economic Issues*. <https://doi.org/10.1007/s10834-010-9219-y>.
- Shreck, A., C. Getz, and G. Feenstra. 2006. Social sustainability, farm labor, and organic agriculture: findings from an exploratory analysis. *Agriculture and Human Values*. <https://doi.org/10.1007/s10460-006-9016-2>.
- United States Department of Agriculture. 2012. U.S. household food security module. <https://www.ers.usda.gov/media/8271/hh2012.pdf>. Accessed 10 November 2022.
- Villarejo, D. 2012. Health-related inequities among hired farm workers and the resurgence of labor-intensive agriculture. Kresge Foundation. <https://kresge.org/sites/default/files/Health-farm-worker-white-paper.pdf>. Accessed 10 November 2022.
- Weigel, M. M., R. X. Armijos, Y. P. Hall, Y. Ramirez, and R. Orozco. 2007. The household food insecurity and health outcomes of U.S.-Mexico border migrant and seasonal farmworkers. *Journal of Immigrant and Minority Health*. <https://doi.org/10.1007/s10903-006-9026-6>.
- Whitt, C., N. Miller, and R. Olver. 2022. America's farms and ranches at a glance. United States Department of Agriculture Economic Research Service. Economic Information Bulletin Number 247. <https://www.ers.usda.gov/webdocs/publications/105388/eib-247.pdf?v=313.9>. Accessed 08 March 2023.
- Wirth, C., R. Strohlic, and C. Getz. 2007. *Hunger in the fields: Food insecurity among farmworkers in Fresno County*. California Institute for Rural Studies. <http://lib.ncfh.org/pdfs/7338.pdf>. Accessed 10 November 2022.

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Springer Nature or its licensor (e.g. a society or other partner) holds exclusive rights to this article under a publishing agreement with the author(s) or other rightsholder(s); author self-archiving of the accepted manuscript version of this article is solely governed by the terms of such publishing agreement and applicable law.

Briana E. Rockler is an Assistant Professor of Public Health at the University of Wisconsin-Eau Claire. She has expertise in developing, implementing, and evaluating nutrition education programs in low-income communities aimed at healthy eating, food safety, and improving food security. Briana received her Ph.D. in Public Health from Oregon State University and her M.P.H. from Kansas State University.

Stephanie K. Grutzmacher received her Ph.D. in Family Science from the University of Maryland in 2007. Prior to joining OSU in 2015, she was an Extension Specialist and Research Assistant Professor at the University of Maryland School of Public Health. Stephanie's research aims to understand unique experiences of food insecurity among vulnerable populations in order to identify best practices for food safety net and nutrition education programs. She works with SNAP-Ed, extension, and community collaborators to develop, implement, and evaluate programmatic strategies in family, school, retail, worksite, service agency, and community settings. She also facilitates a community development and capacity building partnership with public health and agriculture faculty at two universities in Ethiopia.

Jonathan Garcia received his doctorate from Mailman School of Public Health at Columbia University and postdoctoral training at the Yale School of Public Health. He uses innovative and participatory methods to develop public health interventions and inform the implementation of clinical trials. He works both globally and domestically on health disparities that emerge at the intersection of sexuality, gender and race. His work has focused on devising community-led approaches to social inclusion, HIV prevention, and Hepatitis C treatment access, especially among Latinos and LGBT populations. He maintains key partnerships in Brazil, Peru and India.

Marc T. Braverman Ph.D received his Ph.D. in Educational Psychology from University of Wisconsin-Madison. Marc's research interests include adolescent health; health promotion theory and health interventions; smoking prevention and control; tobacco policy; program evaluation design and analysis; and design and delivery of community programs.

Ellen Smit Ph.D. R.D. is a nutritional epidemiologist. Her research is focused on diet, metabolism, and physical activity in relation to both chronic disease and HIV infection in diverse populations. Studies include cohort designs, multi-center studies, survey analysis of national databases, and linking of registry data sets.