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An evaluation of refugee farmers in the Sacramento Valley to inform a USDA-funded food-safety training program

By

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Abstract

Food safety is a critical component of agriculture production and marketing. Agriculture extension services in California disseminate information to growers on effective food safety practices to reduce the risk of illness caused by contaminated produce for consumers and growers. However, there is a diversity of growers in California that have unique characteristics in terms of methods of production and marketing, and diversity in learning preferences and needs. Among the population of producers in California, and in the United States, are resettled refugees. To better understand the particular food safety needs and learning preferences of refugee farmers in California, fifteen semi-structured interviews were conducted with Lu Mien, Iraqi, and Nepali/Bhutanese growers in the Sacramento valley. Social Cognitive Theory was then applied as a framework to analyze learning preference responses among growers. The consistent reference of social (peers, family, mentors) and physical (crop health and physical health) factors in learning-related responses validated Social Cognitive Theory's use as a framework for analyzing learning preferences in agricultural extension. Although there was variation among the interviewed refugee farmer groups in terms of food safety awareness and needs, growers prevalently highlighted the importance of safe chemical (pesticide) use and the importance of food safety for consumer and personal (family) health. Additionally, although hygienic practices (at both the farm-level and personal-level) are being followed, interviewed farmers generally did not elaborate or connect why those practices are specifically necessary to reduce pathogen spread and contamination. The findings from the interviews and subsequent analysis was then used to inform the design of a USDA-funded food safety training program, led by the International Rescue Committee, that will be delivered to these same refugee farming groups.

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Introduction

The United States Department of Agriculture (USDA) defines food safety as “the conditions and practices that preserve the quality of food to prevent contamination and food-borne illnesses” (USDA Knowledge Article, 2019, para. 1). This expansive and vague USDA definition of food safety highlights the broad set of on-farm, packhouse, or vendor activities that can be attributed to food safety, spanning production to postharvest management, in order to ultimately deliver a product safe for consumers.

Although food safety is a critical component of agriculture, growers face a confusing and overwhelming confluence of guidelines and regulations in California on how to effectively implement food safety (Parker et al., 2011). Furthermore, in the absence of an outbreak directly related to the product being sold by farmers, growers logically can interpret that their current practices are sufficient (Parker et al., 2011). In contrast to California’s comprehensive guidelines, many developing countries have a dearth of food safety guidelines due to inadequate capacity for enforcement, testing infrastructure, and limited public awareness of the importance of food safety (Akhtar et al., 2014). In these circumstances, refugees who have resettled and are farming in the United States may face a detrimental combination of a lack of foundational knowledge in food safety and a complicated regulatory or guideline structure – creating a knowledge gap. Agricultural extension (agriculture-related education or outreach) or training for these refugee farmers is a valuable tool to close this knowledge gap.

Culture and learning are linked, and how a culture learns is part of an individual’s identity (Morrice, 2012). When agricultural extensionists engage farmers from another culture – resettled refugees for example – there is ideally a recognition that Western approaches to learning may not, even more likely will not, align with learning philosophies held by the foreign-born farmers (Merriam & Bierema, 2013; Elias & Merriam, 2005). However, there is evidence that some agricultural extensionists do not typically critically reflect on the adult educational theories or approaches that may characterize their training

practices or they primarily align with traditional Western philosophies of education (Alexander et al., 2020). A benefit of having a foundation of various adult education theories is to have the capacity, and choice, to adapt the method of training delivery to satisfy the learning preferences of the participants. Furthermore, beyond learning philosophies, in agricultural extension there is a recognized challenge and deficiency to provide information in all of the native languages spoken by farmers in the United States (Thao et al., 2019). Among farmers whom could benefit from extension efforts tailored to specific learning preferences and in native languages are refugees resettled in the United States and operating small-scale farming systems.

Refugees and Farming in the United States

Utilizing their experience as farmers in their countries of origin, some resettled refugees in the United States have continued farming for income and as a food source (Minato, 2004; de Castro et al., 2014). Refugees resettling in the United States frequently face food insecurity challenges (Hadley et al., 2010). Burdened with a combination of low incomes, reliance on food stamps, and a limited selection of foods to which they are accustomed, refugees can also suffer health consequences due to poor nutrition – both weight gain from processed food and weight loss caused by a lack of calories due to limited income and access (Hadley et al., 2010). Producing food, as a gardener or farmer, can help alleviate these negative health impacts. Furthermore, for those fleeing traumatic experiences, continuing farming in the United States can be a therapeutic connection to their birthplace (Tan, 2020).

Recognizing the benefits agriculture provides for resettled refugees, the International Rescue Committee (IRC) started the New Roots Farm (NRF) program to give resettled refugees access to small growing plots (International Rescue Committee, 2018). There are ten New Roots farms or gardens in the United States (E. Spring, personal communication, November 29th 2020). Refugees participating in the NRF program receive regular training in agricultural related topics along with material support – tools,

soil, seeds, supplies – for production (International Rescue Committee, 2018). The NRF locations also host fruit and vegetable stands where produce grown at the NRF can be sold to the general community (International Rescue Committee, 2018).

Refugee groups involved in this study

The United Nations High Commission for Refugees (UNHCR) defines a refugee as “someone who is unable or unwilling to return to their country of origin owing to a well-founded fear of being persecuted for reasons of race, religion, nationality, membership of a particular social group, or political opinion” (UNHCR, 2007, p. 3). Since 1975, three million refugees have been resettled in the United States (UNHCR Refugees in America, n.d.). Four refugee groups were interviewed in this study - lu Mien, Iraqi, Nepali/Bhutanese, and Sudanese – that are farmers with NRF in Sacramento, California and Salt City, Utah or farmers operating independently in the Sacramento Valley in California. These four refugee groups are the targeted participant groups for a USDA-funded food safety training program this research is designed to support (*detailed in the Research Objectives section*).

After recruitment by the United States Central Intelligence Agency to fight North Vietnamese and Laos communists, the lu Mien (also known as Hmong) were forced to flee Laos to Thailand in 1975 at the Vietnam War’s conclusion, as the United States removed its military presence in the region (Goodkind, 2006). The lu Mien resided in resettlement camps in Thailand for up to twenty years while they awaited permanent resettlement in third countries (Goodkind, 2006). Since 1975, the United States has resettled hundreds of thousands of lu Mien, with approximately 300,000 as of 2001 and close to 100,000 living in California as of 2010 (Miyares, 1997; Goodkind, 2006; Thao et al., 2019; Pfeifer et al., 2012; de Castro et al., 2014). As subsistence farmers in Laos, many lu Mien continued to cultivate vegetables, fruits and herbs in resettlement camps and then in the United States, often in small-scale, family run operations (Minato, 2004; de Castro et al., 2014).

As of 2010, four million Iraqis had left their war-torn country, representing one-sixth of the population (Bettis, 2010). Seeking resettlement in the United States, as of 2012 only 166,000 were referred to the U.S. Refugee Admissions Program and of those, only one third had been admitted (Yako & Biswas, 2014). Even with the conflict subsiding in Iraq, small-scale militia warfare continues to drive Iraqis from their homes (UNHCR Iraq Refugee Crisis, n.d.). Among the Iraqi refugees resettled in the United States are refugees on Special Immigrant Visas, having previously worked for the United States government in Iraq, and rural Iraqis, reflecting a variety of professional experiences prior to resettlement. Most refugees were not previously agriculturalists (Congressional Research Service, 2020).

Ethnic and religious conflict fueled a civil war in Sudan that ultimately led to the creation of two separate nations, Sudan and South Sudan, in 2011 (Stenvig et al., 2018). Pre-war unrest and continued strife after the establishment of South Sudan has forced 600,000 South Sudanese (as of 2014) to become refugees globally (UNHCR, 2015). Between 2007 and 2015, the United States has resettled over 9000 South Sudanese refugees (US Department of State, 2016). For most South Sudanese resettled in the United States, they came from rural South Sudan rather than from urban settings and have a background in some form of agriculture (Ensor, 2016).

Decades of official policies discriminating against primarily pastoral Hindu Lhotshampas (also classified as ethnic Nepalis as they migrated into southern Bhutan from Nepal in the 1890s) in Bhutan culminated in a 1990 government order to force Lhotshampas who could not prove residency prior to 1958 (the start of a nation building process in Bhutan) to leave Bhutan (Trieu & Vang, 2015; Vonnahme et al., 2015; Kiptinness & Dharod, 2011; Kumar et al., 2013). Consequently, over one hundred thousand Lhotshampas fled from hostility in Bhutan to Nepali and Bangladeshi resettlement camps in the early 1990s and many remained in the resettlement camps until 2007 when they were finally permitted to seek asylum in third countries (Trieu & Vang, 2015; Vonnahme et al., 2015). Post-2007, tens of thousands of Lhotshampa or Nepali/Bhutanese refugees have resettled in the United States, and

frequently have represented the majority of refugees accepted in the United States annually since that time (Trieu & Vang, 2015; Vonnahme et al., 2015; Kiptinness & Dharod, 2011). Although the largest area of resettlement is in the Southern United States, these primarily pastoral Nepal/Bhutanese refugees have been resettled throughout the United States, including California (Trieu & Vang, 2015).

California Extension Services

Briefly, I will review agricultural extension services in California for context and background for why non-profit organizations entities now play a key role in extension. Funding for the University of California Cooperative Extension (UCCE) - a primary extension organization in the state along with the USDA Agricultural Experiment Stations and the California Department of Food and Agriculture (CDFA) - has steadily decreased since 2002, but to its testament UCCE has still achieved significant accomplishments in terms of agricultural productivity and financial returns for Californian growers (Chatterjee et al., 2019). With the decline in funding, other entities (both for-profit and non-profit) now play an important role in providing extension services to the roughly 70,000 farms in California that are growing hundreds of different commodities – a fifty-billion-dollar industry – in tandem with UCCE, CDFA and USDA (CDFA California Agricultural Statistics Review, 2019).

Research Objective

Farming in the United States, after resettlement, offers an opportunity for refugees to build on experience from their countries of origin. However, their foundation of agricultural practices can be extensive for refugees entering the United States' farming sector, there is a substantial amount of unique agricultural regulations, technologies, and practices that apply to United States' agriculture production and postharvest management and that are further compounded by the highly-regulated

agricultural policies in California. The consequence of this knowledge gap can be a deficit in or absence of food safety practices among refugee farmers (de Castro et al., 2014).

To close this knowledge gap, the International Rescue Committee (IRC) (a non-profit), in partnership with University of California, Davis (UC Davis), Community Alliance with Family Farmers (CAFF), and UCCE, received funding for a project titled, *Expanded Refugee and Immigrant Food Safety Outreach Project in Sacramento*. According to the proposal, the project “will expand food safety education and training to farmers belonging to marginalized groups in the Sacramento region.” Funded by the USDA, the project intends to conduct training programs with sixty-four Lu Mien, Nepali-Bhutanese, and Iraqi farmers in the Sacramento Valley covering five critical food safety topic areas: 1) agricultural water; 2) biological soil amendments; 3) chemical safety (storage and application); 4) land use and animal access; and 5) equipment, tools, and buildings and worker training and health and hygiene (*see Table 1 for examples of content for five topic areas*). Although not explicitly mentioned in the grant proposal, these categories align with the six designated categories of the Food Safety Modernization Act (FSMA) – 1) Worker Health, Hygiene, and Training; 2) Agricultural Water for Pre- and Postharvest Uses; 3) Biological Soil Amendments; 4) Domesticated and Wild Animals; 5) Equipment, Tools, Buildings, and Sanitation; 6) Required Records. FSMA is a United States’ law established in 2011 and administered by the Food and Drug Administration (FDA) and consists of regulation and oversight in order to prevent food-borne illnesses (FDA FSMA, n.d.). The interviewed farmers are most likely exempt from FSMA regulations due to size, type, and income amount of their farms, but the similarity is worth noting.

Food safety topic areas for USDA-funded training	Examples of training content
Agricultural water	Water sources (irrigation sources and types of irrigation), preventing contamination in water sources or distribution systems, spread of pathogen from water to crop, water testing, reducing unwanted water aggregation (still water), importance of dryness and sunlight in reducing pathogen spread.

Biological soil amendments	Healthy soil (and healthy microbes), animal manure (raw and processed), safe composting, manufactured biological products.
Chemical safety (storage and application)	Pesticide and herbicide application, safe-use, personal protective equipment, reading labels, application rates and concentration, storage, organic pesticides and herbicides.
Land use and animal access	Wildlife, livestock, and pets – dropping and fecal matter management and prevention.
Equipment, tools, and buildings and worker training and health and hygiene	Worker health (not farming while ill), washing hands, clean restroom facilities (stocked with soap, paper towels, toilet paper), clean clothing.

Table 1 Training content examples per topic area for USDA-funded training for refugee farmers in the Sacramento valley

The intent for any extension effort should be to meet the needs of stakeholders and provide curricula in a format that encourages engagement and adoption. Without establishing the preferred teaching methods for the stakeholders, barriers to adoption, or clearly defining the needs, the impact of an extension program will consequently be lessened. Determining these components prior to the implementation of the USDA-funded food safety training will be beneficial for designing content that is engaging, informative, and has been documented to ultimately increase adoption of novel agricultural practices in other trainings (Hu et al., 2012).

My research collected data through semi-structured interviews from fifteen growers who will be participants in the planned USDA-funded, IRC-led, training. The intent of the interviews and analysis is to collect information concerning topic areas that will ultimately impact training engagement and adoption of practices. Findings from this research have informed the design and delivery of food safety training content. Post-training evaluations conducted by UC Davis and funded by the USDA award will ideally determine whether the incorporation of farmer input into the design impacted the quality of training and evaluate the likelihood that farmers will adopt new food safety practices. As a part of this entire effort, the objective of my research is to determine the needs, barriers to adoption, learning preferences, and social impact of the food safety training or adoption of new food safety practices for

the refugee groups. Subsequent surveys of the farmers will evaluate whether the training design and delivery was effective.

Positionality

My own positionality as this thesis' researcher and interviewer should be examined. After several years working in the context of agriculture for development, I have been involved in the development or participated in the delivery of numerous training programs for smallholder farmers. In those experiences, there was a range in effectiveness and ultimately whether the training was useful for the farmer. A consequence of this variation in quality was a corresponding variation in the adoption of practices or technologies advanced in the training. Consequently, I have developed an interest in how agricultural training or extension can be more effective for farmers and therefore encourage the adoption of applicable practices and technologies that the farmers find beneficial. The food safety training program being developed by IRC in conjunction with UC Davis offered an opportunity to gather insights from future training participants that will inform the design and content of the training.

Beyond establishing the positionality for internal motivation to pursue this thesis, my positionality of being a white, male, graduate student should be recognized. Furthermore, I do not speak any of the native languages spoken by the refugee farmers nor have I traveled extensively, or at all, in any of the countries of origins. Although there is no explicit data or interview responses that accounted for how these positions impacted the interviews, there was likely unconscious influence. Potential examples of how my role as a graduate student from UC Davis influenced responses are instances when interviewees addressed questions to me during interviews that implied I have an inherent level of expertise about food safety. However, at no point during the preamble for the interview did I express that I have any level of expertise on the topic. A small fraction of the interviews was conducted in person or using software that allowed for video, and potentially the use of phones limited or altered the impact of my

position as a white male on the interviews – but this is just conjecture. Additionally, my positionality as a white, male, graduate student and consequently an outsider certainly played a role in the analysis of interview transcriptions. There may have been responses that had layers of context that as an outsider I was not aware of. Again, this is just conjecture without tangible responses explicitly highlighting the effect of this positionality, but it is certainly worth noting. Finally, I have been part of a team that provided training at IRC's NRF in Sacramento in the past in postharvest management of dried fruits and vegetables, which may have influenced in-person interviews on-site although no interviewees recalled my presence as an instructor. Ultimately, I made efforts to be aware of my positionality throughout the research process, however it is likely that my positionality did have some bearing.

Theoretical Framework

I used Social Cognitive Theory as the theoretical framework for analyzing learning preferences and consideration of the most effective methodology for delivery of food safety training. Albert Bandura's Social Cognitive Theory argues that adult learning is driven through social linkages and, beyond simple observation, Bandura posits that an individual's interaction with their environment influences learning and behavior (Bandura, 1986; Schunk 1996). Environment in Social Cognitive Theory encompasses social (for example family, community, peers) and physical factors (anything in the surrounding physical environment) (Bandura, 2001). Visually, the exchange can be represented as a triangle, with bilateral influence among the points of the triangle: learning, person, environment (*Figure 1*). Modeling of an instructor's behavior or practice within a training is a component of Social Cognitive Theory, however, interaction with other learners, the environment itself, is similarly an influential factor (Bandura, 1986). Bandura applied Social Cognitive Theory itself to health-related behaviors and developed the framework to account for complicated dynamics that drive health behavior change (Whitehead, 2001).

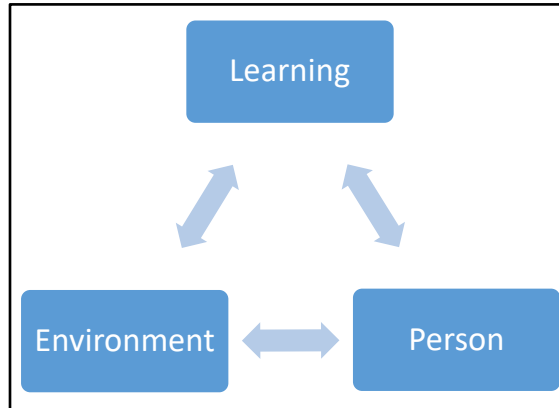


Figure 1 Visual representation of Bandura's Social Cognitive Theory

To summarize the aspects previously mentioned, in this theoretical framework, the environment impacts learning and similarly impacts the person driving behavior change; additionally, direct instruction from an expert and/or through observation and imitation of peers or mentors can result in behavior change; and the individual person who is learning can similarly influence the environment and learning process itself (Bandura, 1986). Additionally, the theory does broaden to capture collective efficacy - the effect of social interaction not only impacts the individual, but the individuals operating within the context of a collective pool knowledge in order to achieve goals interdependently (Bandura, 2002). Finally, among these dynamics is the theory's concept of self-efficacy which Bandura characterized as both the self-perception of the capacity to achieve and also the determination of a personal goal of achievement (Bandura, 1977).

Food safety is heavily health related, and the goal of the planned food safety trainings are to change the behaviors of the refugee farmers. Furthermore, the trainings will be influenced by several environmental forces – cultural dynamics, group dynamics, the agricultural ecosystem itself – which could play an influential role in the learning of the individuals involved in the training. Considering these factors, Social Cognitive Theory was recognized as a potentially valuable framework with which to

interpret learning preferences among participants. Additionally, Social Cognitive Theory's use as a framework in evaluating agricultural extension is limited, offering an opportunity to validate whether the Theory is applicable for this context.

Methodology

In this section I will describe the methodology used for collecting and analyzing research data. In collaboration with IRC and UC Davis faculty, a set of open-ended interview questions were developed. Along with demographic and agriculture background questions about the farmer, questions were designed to elicit responses that address four key areas: the food safety needs of the interviewed farmers; the learning preferences of interviewed farmers; the barriers to adoption of improved food safety practices; and the social impact of adopting new food safety practices. These topic areas were jointly developed between the UC Davis team and IRC to generate responses that would guide trainers involved in the design and delivery of the USDA-funded food safety training program. The twenty questions in total created a semi-structured interview intended to be approximately thirty minutes in length. The set of questions went through several iterations to improve the clarity and intent of the questions prior to the first interview.

Of the twenty questions, eight were categorized as background or demographic questions, five targeted food safety needs and awareness, three addressed learning preferences, two targeted barriers to adoption of food safety practices, and two aimed to anticipate the social impacts on the interviewed farmers of adopting new or changing current food safety practices. The questions were developed in collaboration specifically with Eric Spring (IRC Sacramento), Dr. Vikram Koundinya (UC Davis Evaluation Specialist evaluating IRC's food safety training project), and Dr. Amanda Crump (thesis adviser, Assistant Professor of Teaching in International Agricultural Development, and expert in agricultural extension). A

finalized draft was then circulated to Dr. Margaret Lloyd, Small Farm Program Advisor for Yolo, Sacramento & Solano Counties for review and input.

The open-ended questions also included generalized prompts for the interviewer in case refugee farmer responses were either extremely brief or indicated confusion about the nature of the question. In terms of demographics and background, interview questions were designed to determine age, gender, years of experience farming, what crops are grown, and how those crops are utilized (consumed and/or sold).

The food safety-related questions consisted of awareness-type questions (what food safety meant to the grower, whether they believed consumers could become ill eating produce from another farm), questions to determine what food safety areas the grower would like to learn more about, and finally questions regarding what the grower considered to be the benefits of being food safe on the farm are.

Learning preference questions aimed to determine how farmers learned how to farm originally, how they currently gain more agriculture-related knowledge and skills, and how they prefer to learn new-concepts or practices generally. Barrier to adoption questions generally asked growers whether they perceived any impediments to being able to incorporate any new practices or technologies, while social impact assessment questions primarily were designed to determine who on the farm would bear the responsibility of incorporating those new practice if adopted. Finally, questions about the farmer's capacity to read instructions in English were added to help determine whether training material should be translated.

In recognition of the farmer's willingness to contribute their time, knowledge and perspectives, a twenty-dollar gift card to either Amazon or Walmart (depending on the preference of the interviewee) was provided at the conclusion of the interview.

In terms of selecting the participants, the IRC played a central role in determining candidates in both of the Arabic speaking and Nepali/Bhutanese farmer groups. Farmers within these groups utilize

production areas provided by the IRC through the NRF program. With the exception of two Arabic speaking farmers, all farmers from these two groups operate on IRC's NRF in Sacramento, California. The remaining two Arabic speaking farmers operate at IRC's NRF in Salt Lake City, Utah. IRC, it is worth noting, is intending to disseminate the training materials to several NRF locations across the country, validating the suitability of interviewing two Arabic speaking farmers at the Salt Lake City location. IRC, in collaboration with translators on their staff, specifically selected refugee growers that also sell produce at a farm stand located on the NRF (both Sacramento and Salt Lake City) for the interviews for this research.

Alternatively, recruiting interviewees for the Lu Mien farming group demanded significant outreach. There is not a substantial linkage between IRC and the Lu Mien farmers in the Sacramento Valley. An initial outreach to a lead farmer was established by IRC staff, however following this initial contact several visits were conducted to farm stands operated by Lu Mien growers in the Sacramento Valley for unprompted interviews. Additionally, phone calls were placed to Lu Mien farmers utilizing a list of phone numbers collected by University of California Agriculture and Natural Resources (UCANR), and snowball techniques were implemented to recruit participants.

A total of fifteen interviews were conducted. The breakdown of interviews among participant groups was six Nepali/Bhutanese refugee farmers, four Arabic speaking refugee farmers (two from Iraq, two from Sudan), and five Lu Mien refugee farmers. For the purposes of analysis, the Sudanese and Iraqi farmer responses have been grouped into Arabic speaking farmers because training material will be the same for both the Sudanese and Iraqi growers.

For the Arabic speaking group, every farmer that will receive the food safety training under the funded award from USDA was interviewed while approximately fifty percent of the Nepali/Bhutanese farmers expected to participate in the training were interviewed. Alternatively, only roughly one-tenth of the Lu

Mien growers anticipated to attend the training participated in interviews. Due to the small sample size in the lu Mien farmer group, recommendations and analysis focuses on responses shared within the group that indicate a level of saturation – a point where repetitive themes emerged in interview responses.

Interviews lasted twenty-three minutes, on average, including translation in those instances that translation was needed. Of the fifteen interviews, ten required a translator. Three translators were used to translate Nepali, Arabic, and Mien and the translators remained consistent throughout the collection of interviews. Due to the on-going COVID-19 pandemic, a vast majority of the interviews were conducted remotely. Only three of the interviews were conducted in-person following Centers for Disease Control and UC Davis-approved guidelines. The remaining twelve were conducted over the phone with one of the remote interviews using FaceTime video. All interviews were recorded and then transcribed.

Using NVivo software, code selection for transcription generally adhered to the themes used to develop interview questions – demographics, agriculture related background, food safety, learning preferences, barriers to adoption, and social impact. In terms of food safety, codes were further refined to align with the pre-determined six topic areas for the food safety training – agricultural water; biological soil amendments; chemical safety (storage and application); land use and animal access; equipment, tools, and buildings; and, work training and health and hygiene. From this baseline, coding became inductive in order to capture response topics that strayed from these areas or when more precise detail was needed in the coding to accurately categorize a response.

To maintain anonymity, farmers are identified in this thesis by the refugee group, their age, and then their gender. Nepali/Bhutanese farmers, for example are identified as NBFarmer[age][gender (M or F)]. Arabic speaking farmers are identified as ASFarmer[age][gender] and lu Mien growers as

MFarmer[age][gender]. There are two slight variations. During an interview working with a lu Mien translator for the first time, a question was asked based on an early format of the questions “What is your age? (Range 20-35, 36-50, 51-70)” and the interviewed farmer responded 36-50 (this question was changed due to early farmer confusion). This farmer is identified as MFarmer36-50F. Second, there were two lu Mien male farmers who were 57 years old and consequently they are distinguished as MFarmer57Ma and MFarmer57Mb.

In the analysis below, direct quotations are only used when a translator was not utilized for the interview. Approximately two-thirds of the interviews required the assistance of a translator.

Results

The results below are the synthesis of interview responses, post-coding in NVivo, and distributed into six overarching categories – Demographics, Food Safety, Learning Preferences, Barriers to Adoption, Social Impact, and Capacity to read instructions in English – and separated by refugee farming group. An analysis of key findings and their potential significance is presented in sections following this description of results below.

Demographics/Farmer Background

Below is a summary of responses regarding farmer age, gender, years of experience farming, what crops they grow, and whether they sell and/or consume (including family members) those crops.

lu Mien farmer group: The farmers’ ages in the lu Mien farmer group ranged from 31 to 57 years old.

Two of the farmers interviewed were women and three were men. MFarmer57Ma started farming approximately 20 years ago, however the remaining farmers have been farming since their childhood in their respective countries of origin. The approximate average years of farming experience for the farmers interviewed for this group is 32 years.

The Lu Mien farmer group primarily grows strawberries (in the case of MFarmer31M and MFarmer57Ma almost exclusively strawberries), but some of the farmers also produce blackberries and a variety of vegetables (MFarmer36-50F, MFarmer56M, and MFarmer57Mb). All Lu Mien farmers sell and consume their crops. Strawberries and other crops are sold at the farmers' individual farm stands located in the Sacramento Valley.

Arabic speaking farmer group: Four Arabic speaking farmers were interviewed, two Iraqi and two Sudanese. The Iraqi farmers were both 50 years old, one woman and man, and the Sudanese farmers were a 66-year-old man, and a 40-year-old woman. Three of the farmers, ASFarmer50M, ASFarmer66M, and ASFarmer40F, grew up in a family of farmers in their respective countries. ASFarmer50F, alternatively, only has four years of experience. The approximate average years of experience farming for the farmers interviewed for this group is 34 years.

All four producers grow a variety of vegetables – onions, green beans, cucumber, chilies, okra, tomatoes, and eggplant – and, with the exception of ASFarmer50M, sell their produce. ASFarmer50F sells both at the NRF farm stand and at a local market in Sacramento while ASFarmer40F and ASFarmer66M sell at the farm stand at NRF in Salt Lake City. All farmers (along with their family) eat the vegetables they grow and also give away some of that produce to friends.

Nepali/Bhutanese farmer group: The six Nepali/Bhutanese farmers interviewed were five men whose ages were 30, 32, 37, 48 and 60 and one woman who was 53 years old. There seemed to be two groupings in terms of farming experience – NBFarmer48M, NBFarmer60M, NBFarmer32M, and NBFarmer53F all grew up farming in either Nepal or Bhutan. Alternatively, NBFarmer30M and NBFarmer37M both gained most of their experience here in the United States, with five years and four years of farming experience respectively. Approximate average years of experience farming for the farmers interviewed for this group is 28 years.

The six farmers all grow a range of vegetables including okra, pumpkin, potatoes, onions, garlic, mustard greens, kale, cucumbers, cauliflower, cabbage, tomatoes, green beans and green onions. Five of the six farmers sell their product at the NRF Sacramento stand, and NBFarmer60M also sells his harvest to a local school and NBFarmer32M sells to friends and coworkers. Only NBFarmer37M farms for solely at-home consumption and all six, along with their family and friends, consume what is not sold.

NBFarmer60M, in particular, was motivated to expand his capacity to sell more of his harvest outside of the NRF farm stand and the school.

Food Safety

This section of the thesis focuses on responses from refugee farmers that pertain to food safety and are aligned to the five training themes planned by IRC for the upcoming USDA-funded food safety training.

For reference, those five topic areas are: 1) agricultural water; 2) biological soil amendments; 3) chemical safety (storage and application); 4) land use and animal access; and 5) equipment, tools, and buildings and worker training and health and hygiene. Furthermore, a review of responses regarding whether refugee farmers interviewed believe produce from another farm could get someone sick is included along with what the refugee farmers considered were the benefits of being food safe on the farm. Finally, expressed food safety needs (topic areas they would like to have included in the training) are captured.

lu Mien farmer group: Every farmer in the lu Mien farmer group associated proper pesticide usage with food safety. MFarmer31M equated organic with no pesticide usage, and organic with being food safe. MFarmer56F and MFarmer57Ma highlighted the importance of being knowledgeable about the pesticide being applied (toxicity, re-entry period, duration needed to wait post-application to ensure safe harvest). One possible reason why lu Mien growers consistently mentioned pesticides in relation to food safety, with relatively less consistent mention of other food safety topic areas, is that an annual

county agriculture meeting goes over standards for pesticide application that is attended by small-scale growers in the Sacramento Valley Region. MFarmer57Ma and MFarmer56F explicitly mentioned that food safety is, at least in part, following the guidelines set by the county. MFarmer57Ma, when describing what food safety meant to him, stated, “I just have to look at what the county regulations to do, how to do, food safety, that's all right now” and MFarmer56F commented when asked about how she defines food safety, “Yeah what the county tell me to do, we just follow the direction.” It is worth highlighting that pesticide safety only represents one aspect of food safety and only one of the five planned topic areas for the USDA-funded food safety training.

Other food safety topics were noticeably generalized— cleanliness but no specific mention of facilities or tools being kept hygienically, for example. In terms of specifics, washing harvest or product for food safety was discussed by three farmers (MFarmer57Mb, MFarmer36-50F, and MFarmer57Ma) and keeping out animals was highlighted by one farmer, MFarmer57Ma, “be careful don't have any animal.” MFarmer57Mb did mention general contaminates on the farm, but provided few specifics.

Two lu Mien farmer group farmers were not sure if produce from another farm could get someone sick – Mfarmer56F and MFarmer36-50F. This could be more of a reflection that these two farmers did not want to venture a guess, or did not feel comfortable potentially labeling other farmers as potential sources of contamination. Alternatively, MFarmer57Ma, MFarmer57Mb, and MFarmer31M stated that it is certainly possible for produce from another farm to cause illness. MFarmer57Mb specifically mentioned that new growers, growers that do not pay attention to labels, and growers that use chemicals without fully understanding the chemical’s potential toxicity could be selling produce that could make someone sick. He also highlighted how this is a significant concern for him as a farmer and seller, that if a farmer selling a contaminated product near his stand and gets a customer sick, there is a possibility that this would impact his own business - “I see people selling close by at the corner I say ‘wow’ I am just hoping there is no problem. If something happen, then you know then it will be relate

[sic] to my stand. It is something that really concern me, people we don't know where they get it from, you know people get sick, 'so I get that from that corner' you know, close by, close by."

Importance of food safety and expressed food safety training needs for the lu Mien farmer group:

Several farmers highlighted the importance of food safety in terms of ensuring the health of their family and of their customers (and peripherally the health of their business if the customers remain pleased with the product). Three out of five lu Mien farmers interviewed highlighted the importance of food safety in terms of health generally and there was significant concern among four of the five farmers about the potential of them getting a consumer sick, or another nearby stand getting a consumer sick and hurting their business. MFarmer57Mb commented that food safety is very important when selling to the public stating, "Yeah it's very important you know if you are doing something wrong you might you know, your people get sick or your product not good and you might lose the sale." MFarmer31M mentioned that food safety means providing healthy food to the community, "It means to me that you're growing everything the correct way, the right way, and making sure everybody eats healthy, healthier, making sure that produce and everything that you're growing is actually really good for the community for everybody." Finally, MFarmer56F stated that she has a fear of getting people sick with her produce and is inclined to wait longer than even the recommended pre-harvest interval recommended by manufacturers; "We scared people get sick, you have to follow the direction what they [pesticide label] tell. Sometimes I wait for more than the direction." There seems to be a level of responsibility to their customers that many of the lu Mien growers interviewed sense as small-scale commercial growers.

In terms of food safety needs, one farmer stated that he did not think he needed to learn more about food safety, MFarmer57Ma, and just intends to follow the annual guidelines provided in the county agriculture meeting. With the exception of MFarmer57Ma, although no lu Mien grower interviewed

provided a specific food safety area or topic they wanted to learn more about, they did state they wanted to learn more about food safety in general.

Arabic speaking farmer group: All farmers in the Arabic speaking farmer group correlated food safety to no chemicals (pesticides) being used or present on the produce. The strong association of pesticide-use with food safety observed in the Arabic speaking farmers was similar to what was observed in the Lu Mien farmer and Nepali/Bhutanese farmer groups (discussed below). With the exception of ASFarmer66M, this group of farmers all responded that “organic” produce means that it is safe. However, ASFarmer66M stated that natural, or without chemicals, equals food safety, a quality associated without organic growing. ASFarmer40F stated that one of the things food safety means for her is that all of the vegetable she plants are organic. More qualities of what makes food safe on the farm were elaborated on by some of the growers in this group, but the association with organic or chemical free was consistently the first quality mentioned in responses. It is also worth highlighting here that ASFarmer50M responded that he purchases pesticides from Home Depot, based on recommendations from the IRC NRF Sacramento farm manager, to apply on his plot at NRF in Sacramento. It is not clear whether the pesticides suggested are organic, but certainly could be.

With the exception of ASFarmer66M, all growers mentioned the importance of washing produce, but only ASFarmer50F mentioned that washing hands, along with produce, is an aspect of food safety. ASFarmer50M considered washing product to be the most important food safety practice. None of the farmers in the Arabic-speaking farmer group mentioned washing tools, water as a contamination source, or farm facility cleanliness. ASFarmer40F mentioned a process followed for packaging of vegetables at NRF – produce is washed then placed in a plastic bag. ASFarmer40F also mentioned that a need for her is to have a fence for the Salt Lake City farm to keep out animals (dogs) to prevent contamination for food safety.

Although one farmer stated that produce from a farm could not get someone sick (ASFarmer66M) and ASFarmer50F was not sure whether this is possible, the other two farmers did think it was possible to get sick from produce. ASFarmer40F mentioned that she did not think it was possible then later in the interview mentioned that she does not purchase produce from the grocery store because it has chemicals. Both farmers that thought it was possible to get sick from produce at another farm exclusively associated the potential for chemicals on the produce as the source of illness. ASFarmer50M elaborated that he did not believe diseases could be transmissible from produce because a consumer can visually see disease in produce and avoid purchasing the product.

Worth noting are ASFarmer40F and ASFarmer66M responses regarding food safety steps in light of COVID-19. They discussed briefly additional steps NRF in Salt Lake City is taking when selling produce at their farm stand during this pandemic.

Importance of food safety and expressed food safety training needs for the Arabic speaking farmer

group: ASFarmer50M mentioned that food safety on the farm is important from the perspective of the consumer because the consumer frequently does not wash produce at home. Finally, food safety was directly associated to health (farmer and farmer's family's health) by three of the four growers.

ASFarmer66M and ASFarmer40F both highlighted how the food they grow is healthier than food that can be purchased in the market.

Specifics in terms of what interviewees in the Arabic-speaking farmer group wanted to learn about or what needs are related to food safety were limited, and ASFarmer50F mentioned that she is unsure whether there is more for her to learn about food safety. Farmers mentioned wanting to learn more about controlling aphids and pests (ASFarmer50M, ASFarmer50F), storage or food preservation for long periods of time (ASFarmer66M), or seasonal planting cycles (ASFarmer50M) rather than specific areas of food safety (although controlling aphids could include pesticide usage). Three of the four farmers

expressed interest in more training in general and in the case of ASFarmer40F and ASFarmer66M were eager to learn more about food safety specifically.

Nepali/Bhutanese farmer group: A third of the farmers in the Nepali/Bhutanese group – NBFarmer60M and NBFarmer48M - particularly highlighted chemicals (pesticides) as being the primary concern with food safety. Furthermore, half of farmers associated “organic” with food safety or being safe to eat – NBFarmer60M, NBFarmer48M, and NBFarmer32M. NBFarmer60M specifically mentioned that his ancestors have grown organically (and for NBFarmer60M organic was synonymous with food safety) for generations. NBFarmer32M also stated that he learned from his forefathers the importance of eating organic for health, and he similarly equated organic to being food safe.

The Nepali/Bhutanese farmer group consistently referenced food safety in the context of cleanliness or hygiene. The hygiene component of food safety from the Nepali/Bhutanese farmer group was described both in specifics and as general cleanliness in some instances. For example, NBFarmer37M stated, “Make the farm clean” as a part of food safety and NBFarmer32M commenting that food safety is to basically keep everything clean. The responses addressing specific examples of hygiene practices were from NBFarmer48M (wash hands after going to the bathroom, keeping animals out of the farm), NBFarmer37M (wash hands) and NBFarmer30M focused on cleanliness and keeping the product clean and hands clean. NBFarmer53F, who is currently in a food safety training at IRC, had a list of steps for food safety – 1) wash hands for 25 seconds; 2) if you have a cut leave the farm; 3) remove animal dung from farm plots. Four farmers again vaguely mentioned general farm cleanliness but only one farmer mentioned water as potential contamination. Only NBFarmer37M highlighted the reason why cleanliness (hygiene) is important. NBFarmer37M mentioned that food safety is preventing crops from being contaminated by dirt, bacteria, diseases, and insects. NBFarmer37M was the only farmer to mention “bacteria” in all interviews. NBFarmer37M works in an almond packhouse in Sacramento and receives regular food safety trainings.

Two of the Nepali/Bhutanese farmers did not think produce from another farm could get someone sick (NBFarmer30M and NBFarmer60M). NBFarmer37M, the almond packhouse worker and one of the four Nepali/Bhutanese farmers that believed it was possible to get sick from produce from another farm, stated:

“It depends on how they keep the farm, clean, dirty, whatever. If it is a dirty farm then yeah gonna get the bacteria out of whatever. That is the possibility. But if it is clean, really hygienic, and they grow with the federal guideline or the state guideline, or whatever it is, it should be good, no diseases. But that is always a possibility.”

NBFarmer48M mentioned that rotten produce from a farm could get someone sick. NBFarmer53F mentioned that whether someone can get sick from produce is dependent on whether the grower selling the produce was sufficiently trained – it is worth noting here that NBFarmer53F, at the time of the interview, was enrolled in a food safety class provided by IRC. NBFarmer32M said it is possible to get sick from produce from another farm if the farm is not clean.

Importance of food safety and expressed food safety training needs for the Nepali/Bhutanese farmer

group: All farmers in this group mentioned health or healthy (either general good health, their own health, their families’ health, or consumer health), life, and not getting sick in correlation to food safety. As an example, NBFarmer37M stated for benefits of being food safe, “Number one is you are eating the healthy food. You [sic] are producing the food by myself for my family.”

All Nepali/Bhutanese farmers interviewed expressed that they are interested in learning more about food safety, however the specific food safety topics they wanted to learn about remained general, even after probing questions. In response to a question asking what they would like to learn more about in terms of food safety, NBFarmer60M and NBFarmer53F did specifically request training on how to make an effective compost, applicable for the biological soil amendment topic area for the food safety training.

Learning Preferences

This section of the thesis captures responses from refugee farmers addressing learning preferences. These responses included how farmers learned how to farm, how they prefer to learn new farming practices now, and how farmers learn new tasks or skills in general (outside of farming).

lu Mien farmer group: All of the farmers in the lu Mien farmer group initially learned how to farm from their family. All farmers in the group rely on peers to learn new approaches to production. Almost universally the approach was to watch then trial the practice themselves. For example, MFarmer56F stated, “We learned from friends. First, I go to help a friend, to work for them, look at them.” Similarly, MFarmer57Mb reflected, “You just learn from other people, you know like, ask the question, and then just do, and when you don’t know something ask other grower, then you learn it yourself.”

Three of the five farmers specifically discussed their capacity and interest in testing, verifying, and experimenting in agriculture. MFarmer56F recounted that she contacts distributors and vendors of improved fertilizers or strawberry varieties and then conducts tests to determine their performance, “Let's see my soil is right or not. I test different varieties.” MFarmer31M highlighted that he feels comfortable taking risks and trialing new approaches. MFarmer57Mb discussed a broad range of commodities that he is learning to grow through gathering information then using trial-and-error techniques, including with new varieties of fruit trees – “I have all kinds of peaches and plums, you know all kinds of trees, I want to put it, at least if I know it, I want to put one tree and see what they do.”

Two farmers mentioned that watching videos are a helpful method for learning new things. MFarmer57Mb used tree grafting as an example when asked about using videos, stating, “Yes, sometimes, I learn how they graft the tree, those kind of thing. I try to do it my own too, I learn from it, and I try it, it worked.” In contrast, another lu Mien farmer explicitly said videos are not helpful.

Elaborating on when Lu Mien farmers have questions about agriculture, or when they want to learn something about agriculture that they do not know about, by far the universal response was to ask peers or other growers (and growers that are friends). One grower, MFarmer57Mb commented in terms of asking peers for guidance: “Well, I grow up with farmers in Laos. I have idea how to farm. Just like when you are farming, you just learn from other people, you know like, ask the question, and then just do, and when you don’t know something ask another grower, then you learn it yourself.” MFarmer57Ma mentioned that he also uses, in addition to peers, the county agriculture and UCANR staff at times for guidance. MFarmer56F stated that she draws guidance from several resources, including peers and manufacturers of agricultural products (fertilizers, pesticides and new varieties), to be certain she has the right information.

Arabic speaking farmer group: Three of the four Arabic speaking farmers who grew up on a farm learned to farm from a combination of observation (of parents, other family members) and hands-on activities. Alternatively, the one grower who did not grow up farming, ASFarmer50F, specifically mentioned that a primary source of teaching or information for her is the internet – videos and Google searches. ASFarmer50F stated that she attended a four-year college in the United States, and this may have helped increase her comfort level with this medium. However, ASFarmer50F was not alone in mentioning that videos or digital resources are a method they now use to learn new things.

ASFarmer40F specifically highlighted instructional videos regarding COVID-19 that NRF in Salt Lake City shared as being effective and ASFarmer50M mentioned that he utilizes IRC agriculture production videos but sometimes feels that the information is not new.

Two of the four Arabic speaking farmers utilize experimentation as a method to learn new things. ASFarmer50M and ASFarmer66M both conducted small research experiments on their plots or the produce they harvest. ASFarmer50M focused more on production methods while ASFarmer66M compared the shelf-life of produce he grows versus produce purchased in the market. As a learn-

through-teaching process, ASFarmer40F intentionally brings her two children to the NRF in Salt Lake City to teach them how to grow and to connect them to the culture that she experienced as a farmer in Sudan. Finally, ASFarmer50F, mentioned a level of comfort to take a bit of external information (non-tangible, digital information) and trial it herself - this was mentioned in the context of home design but also regarding accessing videos on growing vegetable online. These farmers consistently referenced IRC NRF managers as providers of key information or learning sources for questions about agriculture.

Nepali/Bhutanese farmer group: NBFarmer37M started farming approximately four years ago and IRC taught him how to farm. The remaining five Nepali/Bhutanese farmers all had experience outside of just IRC and learned from their family or parents on farms in either Nepal or Bhutan. The consistent teaching methods were observation and hands-on training provided by their elders (parents, grandparent) or other members of their family. When reflecting on preferred ways to learn new agricultural techniques, farmers highlighted this same process of learning, including demonstrations, trialing, and pictures as being ways they like to learn. In terms of experimentation as a method for learning, NBFarmer60M specifically recalled an experiment that he conducted comparing the shelf-life of produce purchased from the store and produce that he grows himself and he concluded that the chemicals on the produce from the store decrease shelf-life.

Five of the six Nepali/Bhutanese farmers cited videos or the internet as a resource for learning new things, and in some of those instances for learning new agriculture practices. As an example, NBFarmer48M used videos to learn production practices for okra and NBFarmer37M stated that if there is a question related to agriculture that he needs an answer to he will ask the NRF farm manager, and if the manager does not have an answer, “we might have to search YouTube.” NBFarmer60M commented that he does utilize digital resources but requires assistance from family and friends to conduct the search on his phone.

Every farmer in the Nepali/Bhutanese farmer group referenced IRC when learning new things in agriculture. IRC is consistently noted as the contact point to provide answers to agricultural questions for farmers from this group and specifically the NRF farm manager.

Barriers to Adoption

This section includes a collection of responses regarding what barriers refugee farmers interviewed may confront when considering adopting to food safety practices.

lu Mien farmer group: lu Mien farmers MFarmer57Ma and MFarmer36-50F did not think there is anything preventing them from being more food safe, with MFarmer36-50F specifically saying that she believes that her produce is currently safe. MFarmer31M stated that he thought he was food safe and therefore there are no barriers, but COVID-19 has caused him to question that. Interestingly, MFarmer31M tied COVID-19 to an increase in customers at his family's farm stand and a greater sense of responsibility for communal health:

"Now I don't know because of this COVID thing, now how it has been spiking up, going up lately and things been closing, bar, you know all these things have been closing, but, now, now, I just started noticed these stores are closing and all these places are not opening, a lot of people are flocking to buying things from the farm more. I feel like since it's been going up, it has been more harsh on the farmers in the sense that where they feel like they have a big job to do as far as taking care of the whole community with what their growing because people are now knowing that the stores are not providing what we actually need for our beneficial health."

MFarmer56F highlighted that cost or expense is a barrier to adoption, along with personal health (cannot lift heavy items). Lastly, MFarmer57Mb commented that although he believes he is completely food safe now, there is always something new to learn that one does not know even though MFarmer57Mb has been farming since he was a child.

Arabic speaking farmer group: Two farmers, ASFarmer50M and ASFarmer50F, did not think there were any circumstances or barriers that prevented them from being more food safe. ASFarmer40F did

highlight language as a challenge. Although it was not explicitly mentioned, time could be a significant barrier to adoption for this group (and potentially for all groups). Most of the farmers interviewed in the Arabic speaking farmer group mentioned having full-time jobs. ASFarmer66M, for example, was interviewed while he was watering his crops at approximately 8:30pm local time.

Nepali/Bhutanese farmer group: With two exceptions, farmers stated that there are no barriers keeping them from being food safe or more food safe with NBFarmer30M and NBFarmer32M stating that they are food safe now. NBFarmer48M stated that time is constraint and NBFarmer60M replied that he does not have the same physical strength to maintain his plots as he used to. Interestingly, NBFarmer37M, the farmer who also works in a packinghouse with regular food safety training, highlighted, instead of a barrier, the need and importance to constantly learn more about food safety considering the potentiality of exposure to new pathogens.

Social Impact

Refugee farmers interviewed were asked whether they were primarily responsible for farm activities, and consequently, whether they would be primarily responsible for implementing new food safety practices. The intent of this line of questioning was increase awareness for the food safety training development and delivery team of time constraints or capacity a lead farmer may have for implementing new food safety practices.

lu Mien farmer group: All of the farmers interviewed in the lu Mien farmer group stated that he or she does most of the work on the farm, with support from family or hired labor (for tilling). Additionally, all stated they will be primarily responsible for implementing new food safety practices learned in the training.

Arabic speaking farmer group: Two out of the four Arabic speaking farmers stated that they do most of the work on their plots and will do most of the work to implement the food safety practices learned in

the training. These farmers operating as primary growers also receive varying degrees of support from family members, but ASFarmer40F and ASFarmer50M specifically stated that they communally operate their growing plots with family.

Nepali/Bhutanese farmer group: Two of the six Nepali/Bhutanese farmers responded that the responsibilities for growing and harvesting their produce are shared by their family and any new activities or practices to improve food safety will similarly be the responsibility of the families. Alternatively, the remaining four considered themselves as the primary grower and responsible for implementing any new food safety practices learned.

Capacity to read instructions in English

IRC wanted to determine whether training material – information sheets – could be in English, therefore refugee farmers were asked about their capacity to read instructions in English. Responses are summarized below.

lu Mien farmer group: Three of the five lu Mien farmers can read English. The two farmers that could not read English, MFarmer36-50F and MFarmer56F, stated that they have family that can read instructions in English and provide translation for them. MFarmer56F commented that she can only read a little bit in English, however her interview was conducted without a translator as she has a strong capacity in terms of speaking and understanding spoken English.

Arabic speaking farmer group: There was a range in terms of capacity to read instructions in English in the Arabic speaking group. ASFarmer50F can read instructions in English, ASFarmer50M can read some instructions in English, ASFarmer66M can read a bit but does ask his children to help translate, and ASFarmer40F cannot read instructions in English.

Nepali/Bhutanese farmer group: Capacity to read English varied. NBFarmer30M, NBFarmer37M can read instructions in English. NBFarmer37M's spoken English is extremely proficient, as well. NBFarmer48M can somewhat read instructions in English, NBFarmer32M can understand some English but cannot read instructions, and NBFarmer60M and NBFarmer53F cannot read instructions in English. NBFarmer60M did mention that when he needs to search for something on the internet using his phone, he is able to ask friends or family to enter in the English text, so potentially he has easy access to someone who could help translate the instructions.

Analysis of learning preference results and Social Cognitive Theory framework

The following section is an in-depth analysis of refugee farmer responses to learning preference questions, categorized by refugee farmer group. These responses are then analyzed utilizing Social Cognitive Theory as a framework. For reference, Social Cognitive Theory posits that learning or behavior change occurs through the influence of the environment (social, biological), modeling of the instructor, self-motivation to achieve levels of self-efficacy, and incorporates the concept of collective efficacy to reach communal competency or learning goals.

lu Mien farmer group: Every farmer in the lu Mien farmer group relied on peers (friends, families, fellow growers) when seeking new information (*Figure 2*). This consistent finding reinforces the impact of the environment – in this case social environment - on learning, as outlined in Social Cognitive Theory. There is also a cultural component that could be driving this reliance on peers for learning. The lu Mien are a clan-based society in Laos, with the term “tsev” in Hmong defining a clan relationship that is permanent regardless of geographic location (Miyares, 1997). Considering the strength of these relationships within the lu Mien community, the food safety training planned by IRC could benefit from incorporating a

greater degree of break-out, group learning scenarios that rely on exchanges of information among peers, versus top-down instruction from a trainer.

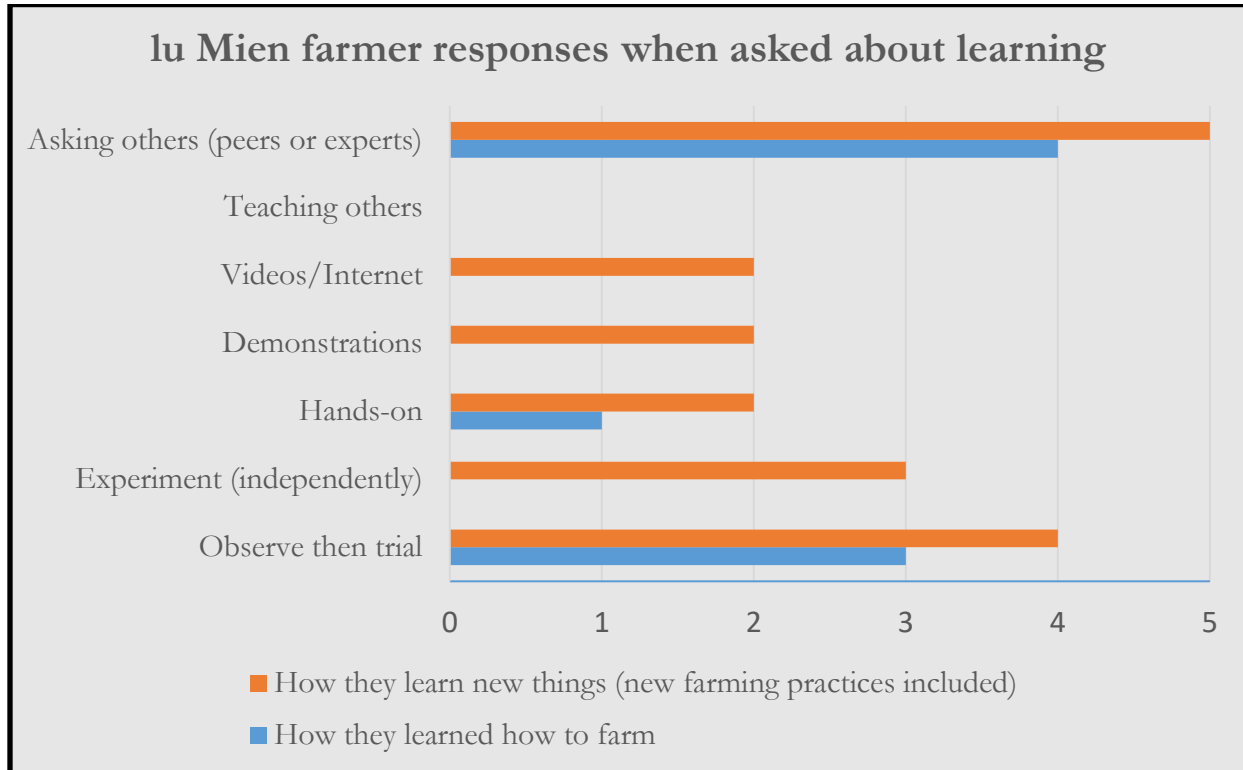


Figure 2 lu Mien learning preferences based on number of farmers who referenced the categorized learning methods.

Social Cognitive Theory incorporates the impact of observing one's surrounding environment on learning. Consistently, lu Mien growers commented that they learn by observing friends or family, then trialing the technique themselves. As MFarmer57Ma stated, when asked how he learned to farm in the United States, "Oh just learn from my friends, I see my friends then do that. When I first came to the United States I have a friend who do that, and I just look at it and I do it." This quality of learning also somewhat reflects modeling of experts, in this case peers that have a greater capacity in a particular topic than the learner, also validating Social Cognitive Theory as a framework. For the USDA-funded food safety training, holding the training in locations where new or improved practices could be

demonstrated, or via incorporation of “model farmers” whom other lu Mien growers could observe for food safety practices, could leverage this preferred method of learning.

In terms of self-efficacy, three of the five lu Mien growers reflected on experiments that they conducted, at their own volition, on their farms. Bandura’s attribution of self-efficacy as a motivation for achieving goals is demonstrated in this individual effort in the lu Mien group to discover for themselves methods for becoming better farmers. Furthermore, four of the five lu Mien growers expressed a desire to learn more about food safety even in those instances where they already considered their farm food safe. For the planned USDA-funded training, incorporating experiment designs that could be adopted by the lu Mien growers for their personal validation of improved food safety strategies may fit well with this learning preference and motivation to increase knowledge.

Four of the lu Mien growers’ responses touched on what could qualify as Social Cognitive Theory’s incorporation of collective efficacy as a driver of behavior change. With one grower in interview responses concerned about the impact on his sales if there is a food safety issue at a nearby stand and three others expressing responsibility or anxiety about getting a consumer or customer sick, there is an indication that the lu Mien growers collectively are inclined to learn more about food safety and change practices to improve the overall communal capacity to sell safe products. This finding supports the Social Cognitive Theory framework’s applicability and points to a need in the IRC’s food safety training to highlight for participants that individual learning will correlate to greater group capacity and ultimately collective benefit. Furthermore, with all growers (and their families) consuming the harvested fruits and vegetables, and most lu Mien farmers recognizing health as a benefit of food safety, promoting improved food safety practices as holistic benefit for their community would incorporate this aspect of collective efficacy into the learning process.

Arabic speaking farmer group: For the growers in the Arabic speaking group whom grew up farming, universally they observed family members and then trialed what they observed to learn how to farm (Figure 3). This approach to learning aligns with Social Cognitive Theory framework’s emphasis on surrounding environment, social and physical, and modeling of experts on behavior adoption. For learning new things currently, half of the Arabic speaking group relied on asking peers or experts to learn new things or preferred demonstrations from trainers in the field. The impact of environment, modeling of experts, and preference for demonstrations in the field to galvanize learning support Social Cognitive Theory’s applicability, and signal a need to incorporate group learning dynamics and physical demonstrations (by experts) that could be adapted by the participants in the USDA-funded food safety training.

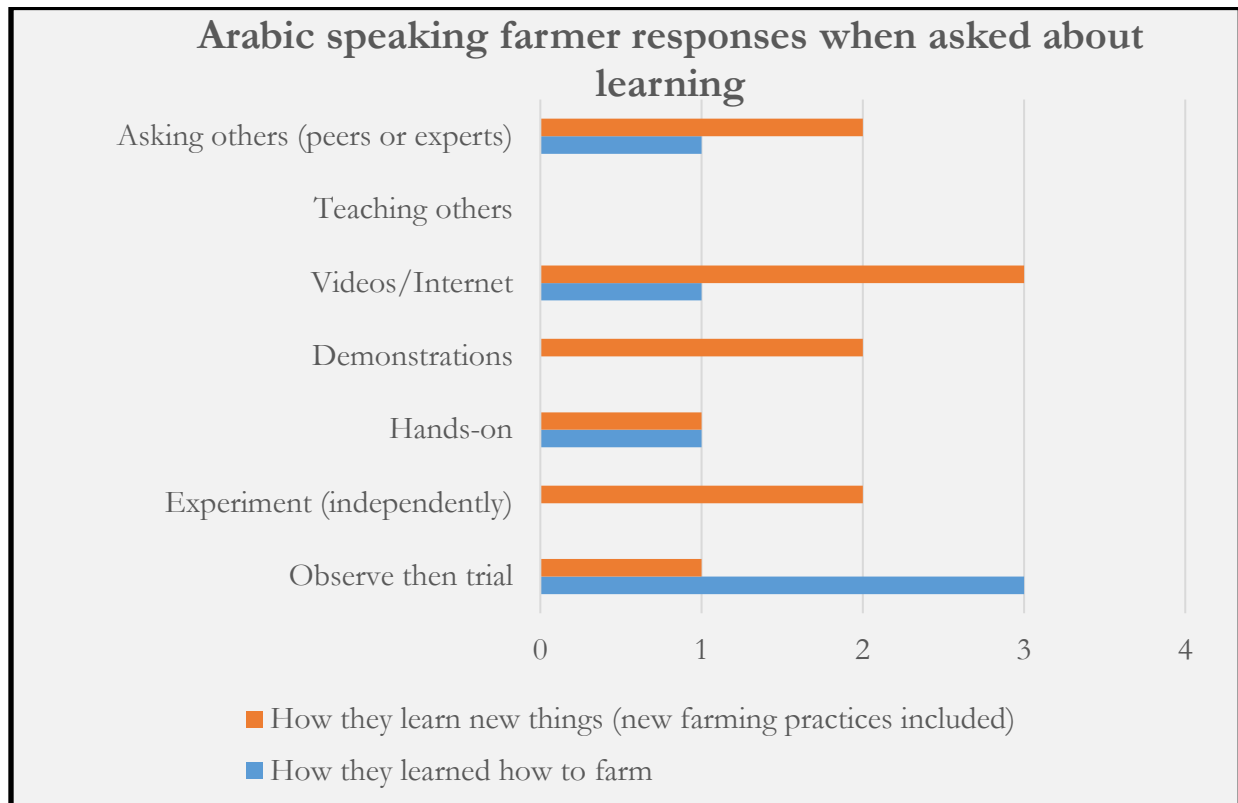


Figure 3 Arabic speaking group learning preferences based on number of farmers who referenced the categorized learning methods.

Three of the four Arabic speaking farmers utilize video or the internet, on their own, to learn and two of the four farmers experiment independently to learn new things. The experimentation was specifically designed to answer agriculture related questions. This self-initiative with videos and experimentation, along with three of the four Arabic speaking farmers expressing a desire to learn more about food safety or agriculture-related topics, indicates self-efficacy and a goal to improve their capacity – again, a pillar of the Social Cognitive Theory. With seventy-five percent of the growers utilizing internet or video, this suggests that delivering components of the planned IRC food safety training using video could be effective for this group, and incorporating experimentation into the training delivery would foster this pursuit of self-efficacy.

In terms of the Social Cognitive Theory's framework and collective efficacy for the Arabic speaking group, all farmers in this group, along with the Nepali/Bhutanese group, operate on the same parcel of land at the NRF. Furthermore, the majority of the Arabic speaking group sell at the farm stands located on the NRF. Highlighting the value of collectively achieving food safety goals for the farmers, their shared customers, and their individual families in the upcoming food safety training could be beneficial in terms of increasing adoption of improved practices. Similar to the Lu Mien refugee farming group, the Arabic speaking group, along with their families, all consume the products they grow and they also all associate health as a benefit of being food safe. Therefore, additionally incorporating into the planned food safety training how improved food safety practices can correlate to improved communal health may increase adoption based on Social Cognitive Theory's association of collective efficacy on behavior change.

Nepali/Bhutanese farmer group: Five of the six farmers in the Nepali/Bhutanese group rely on asking peers or experts to learn new things and four of the six learned how to farm, originally, through observation (of family members) then trialing the practice on their own (Figure 4). Similar to the Lu Mien and Arabic speaking farmer groups, the environment (social and physical) and modeling of experts play a

significant role on learning for the Nepali/Bhutanese group, supporting the applicability of Social Cognitive Theory’s framework. Including group-work, peer-to-peer work, demonstrations, and the use of model farm plots for the USDA-funded training would be beneficial for the Nepali/Bhutanese growers. With one of the Nepali/Bhutanese growers working in an almond packhouse, training could also tap into expertise already within the group to teach certain modules.

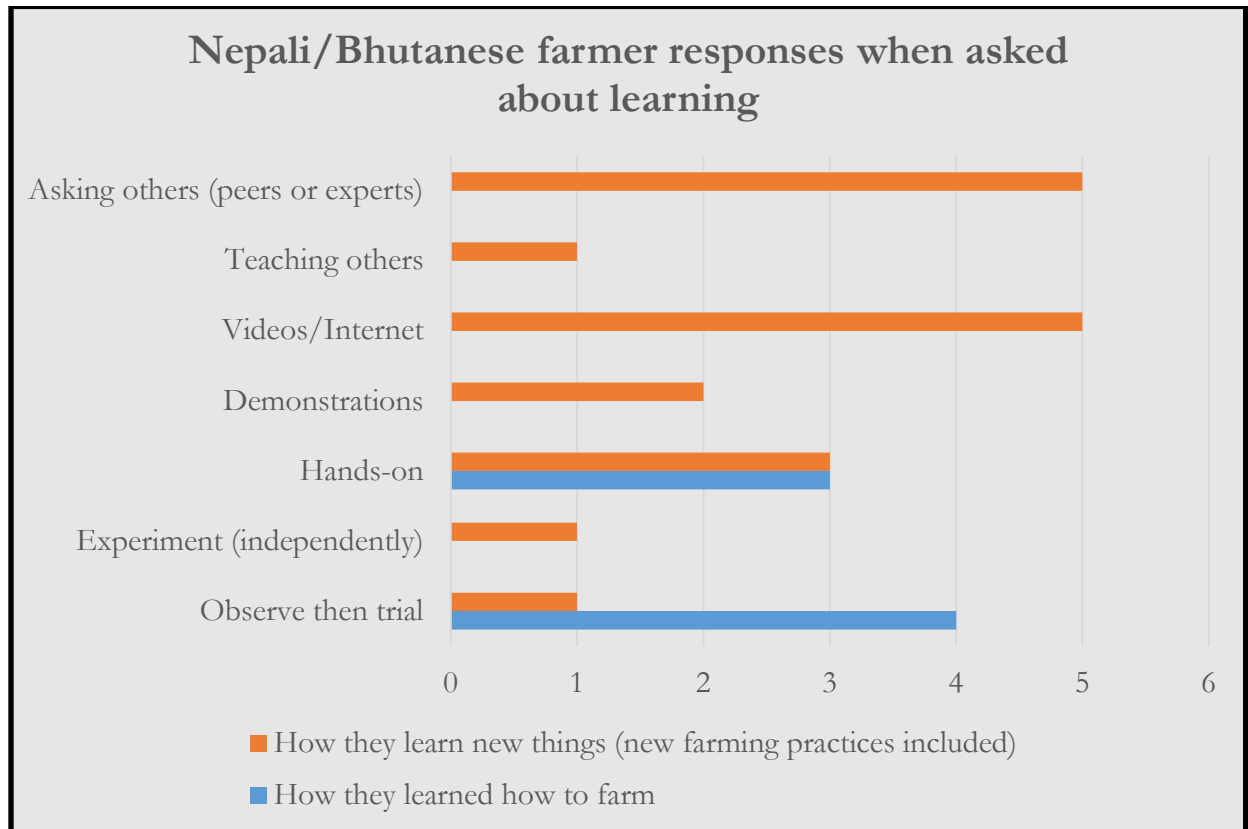


Figure 4 Nepali/Bhutanese learning preferences based on number of farmers who referenced the categorized learning methods.

All Nepali/Bhutanese growers expressed interest in learning more about food safety, an indication the farmers in the group are independently motivated to increase their self-efficacy, supporting the Social Cognitive Theory framework. As additional evidence of self-efficacy, five of the six Nepali/Bhutanese growers utilize video or the internet as a method for learning. Seeking information through videos or the

internet, individually, reflects drive or goal-orientation to improve one's own self-efficacy and that the use of videos for the IRC food safety training could be beneficial.

As noted above for Arabic speaking farmers, the Nepali/Bhutanese farmer group operates on NRF locations and this communal aspect could indicate a collective motivation to increase food safety efficacy – to maintain alignment with the Social Cognitive Theory framework. Additionally, all Nepali/Bhutanese growers considered health to be a benefit of food safety and they (and their families) consume the crops grown, again indicating that incorporating lessons promoting the collective benefit (health) achieved through improved food safety practices into the USDA-funded training could foster behavior change.

Analysis of learning preferences aggregated across all farming groups

In aggregate, across all farming groups, the responses still align with the Social Cognitive Theory's framework (*Figure 5*). All refugee farmers, when combined, referenced learning from peers or experts as a primary method for learning new farming practices or other novel practices which is supported by Social Cognitive Theory's emphasis on both the environment (social) and modeling of experts as drivers of behavior change. Slightly less than half of the interviewed farmers perform experimentation independently to learn new things and more than half utilize videos or internet, both methods of which exhibit determination to independently achieve levels of self-efficacy. Additionally, in combination, learning through observation, hands-on, or demonstrations were frequent responses in aggregation of farmer groups responses, correlating to Social Cognitive Theory's identification of not only social environment, but physical environment and modeling playing a role in learning and behavior change. Finally, as mentioned in the previous sections addressing learning preferences, all farmers are operating within communities (NRF parcels and the Lu Mien strawberry growing communities) that have a communal interest in achieving collective efficacy in food safety practices for holistic returns. In terms of

significance for training design, incorporating peer-to-peer learning opportunities, demonstrations or model-farms or plots, independent experimentation or trialing, and promoting the communal benefits (health, income) of food safety could generate greater adoption of improved food safety practices among growers when considered in aggregation.

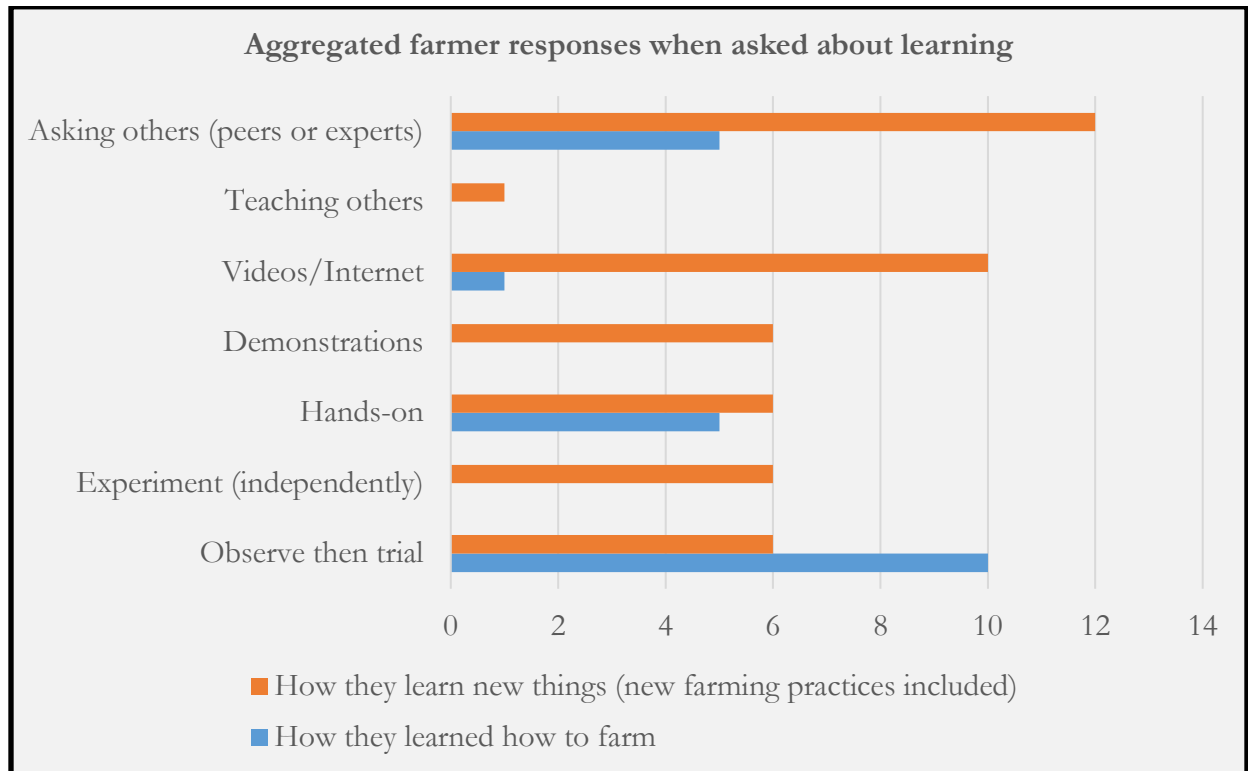


Figure 5 Aggregated learning preferences based on number of farmers who referenced the categorized learning methods

Analysis of other results and recommendations

This section provides an analysis of key findings from the interview responses that were unrelated to learning preferences. These highlighted findings and analysis are separated by refugee farmer group. Subsequently, an analysis of food safety responses, aggregated across all groups, is provided.

lu Mien farmer group: Focusing on findings with this relatively small sample size, the lu Mien responses indicated a strong association and awareness of pesticides and chemicals in terms of food safety (Figure

6). All farmers mentioned pesticides or chemicals, but this is one of the five topic areas for the USDA-funded food safety training. Another discovery, through omission, in the lu Mien group were the generally-limited details or specifics regarding some of the other aspects of food safety that are anticipated for the IRC food safety training. No farmer in this group mentioned agricultural water as a vector for pathogens or worker hygiene. These omissions of some of these details may indicate a gap in connecting the “why” these practices are needed to limit pathogen contamination. Of course, there are possible explanations for these omissions beyond a lack of awareness. For example, strawberries, due to their fragility, are not typically washed postharvest. Additionally, county meetings with extension educators do address safe pesticide usage and consequently the associations made during the interviews were focused on pesticides and chemicals. Regardless, based on this analysis of responses, focusing on non-chemical or pesticide food safety topics and providing information on non-chemical pathogen vectors for contamination for the lu Mien growers is recommended for the IRC food safety training.

Eighty percent of the lu Mien farmers stated that food safety is important for consumers along with their family. Two of the lu Mien farmers expressed that they have a fear of either themselves causing illness for a consumer or another farmer causing illness for a consumer and others conveyed a sense of responsibility to provide healthy food to consumers. The concern about customers could be explained by the lu Mien grower’s greater reliance on income from their farm in relation to the other refugee groups, and that farming is a source of livelihood. Regardless, considering that farming is a livelihood for the lu Mien group and there is concern about sickening consumers, food safety training is recommended to pertain to how a commercial grower operates safely, and how beneficial safety practices could improve the quality of their product while also benefiting the health (again, a majority of lu Mien growers considered health a benefit of food safety) their family, and their customers.

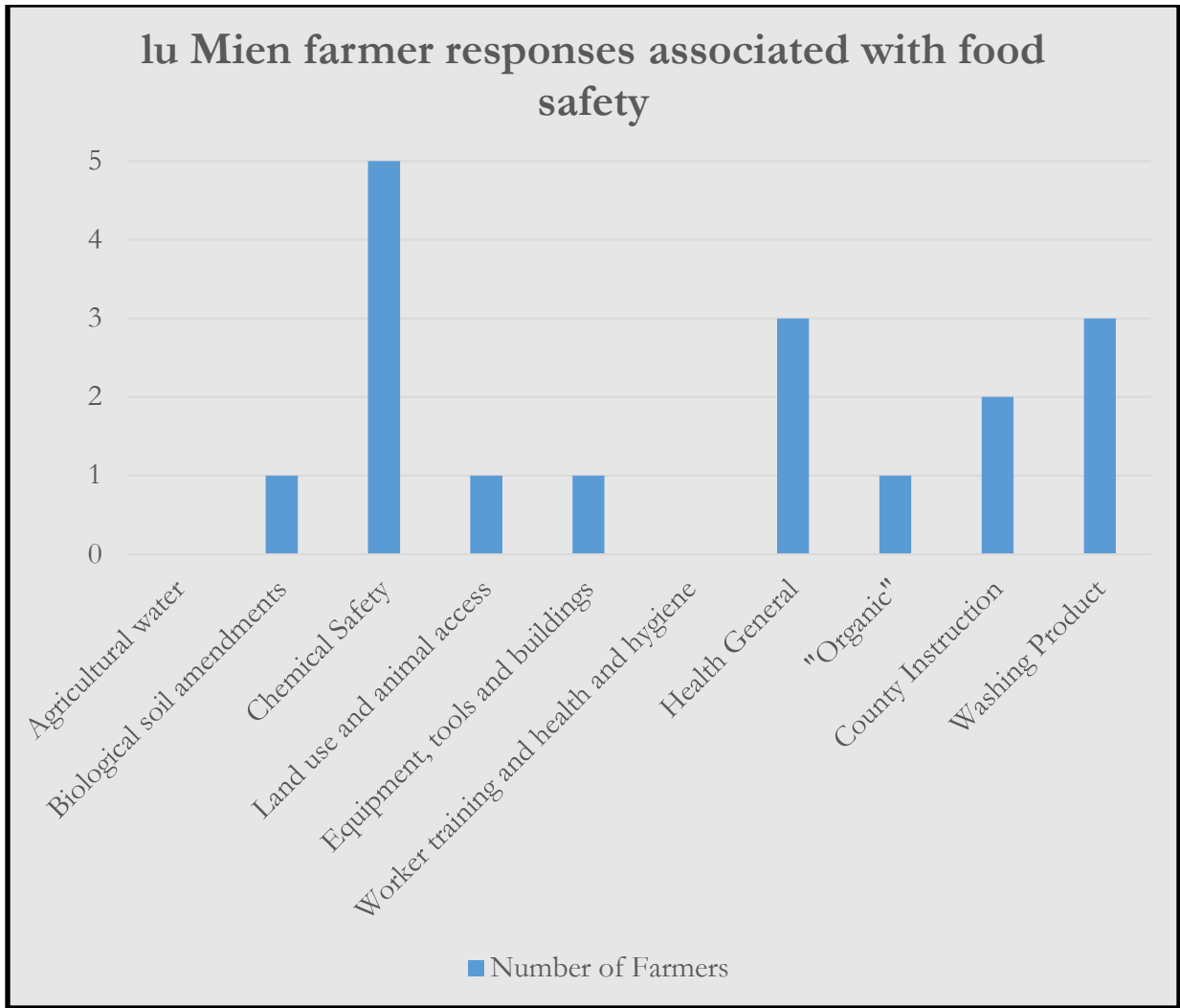


Figure 6 lu Mien farmer responses categorized into food safety categories planned for the training and other pertinent food safety categories. Responses based on number of farmers who mentioned the topic area.

Eighty percent of the lu Mien growers interviewed stated that they are the primary grower and similarly will be the primary person to drive adoption of new food safety practices. Determining the lead grower in each farming operation, particularly if that lead grower is conducting a significant percentage of the labor, is recommended as a component of the outreach for the planned food safety training. Furthermore, the likelihood that these lead growers will be the individuals bearing the burden of incorporating new practices in the training should be considered in terms of estimating potential limitations for adopting practices that demand significant time commitment on the lead farmer’s part.

Potentially establishing a network among the farmers during the training could provide some support structure for these lead farmers as they navigate the integration of new food safety practices.

There is not a clear recommendation in terms of barriers to adoption based on lu Mien grower responses. Four of the lu Mien growers stated that there are no barriers keeping them from being food safe but this subgroup was split on whether the reason why there were no barriers was because they are food safe now or not. One lu Mien grower mentioned financing as somewhat impacting capacity to adopt expensive new practices. Ultimately, there does not appear to be a shared barrier that can be anticipated in the training and thus overcome.

Arabic speaking farmer group: In the Arabic speaking farmer group, there is an association of food safety, or the potential for food to cause illness, that is primarily limited to chemicals – again, chemicals/pesticides and chemical/pesticide storage is only one of the five planned IRC training topics - and not capturing the spectrum of foodborne bacteria or viruses (*Figure 7*). With all farmers in this group associating either organic or natural with products being food safe, this indicates a need to highlight pathogen or biological contamination – or the “why” – again as organic only signifies the use of non-synthetic inputs. This association of organic or natural to food safe neglects vectors for pathogens such as animal feces, contaminated irrigation water, poor farmer and facility hygiene and therefore training is recommended focus in these areas to close this evident gap in awareness. Furthermore, half of the Arabic speaking farmers attributed visual defects (diseases in the produce) to food safety. Highlighting in the training that pathogens can cause harm to consumers of products without causing any visual damage to the produce itself is similarly recommended for the training content. Another universal response among the Arabic speaking farmers in terms of the benefits of being food safe was improved health. This strong association could be leveraged in the planned training in terms of encouraging Arabic speaking farmers to improve food safety practices to decrease the likelihood of harmful health impacts from contaminated produce.

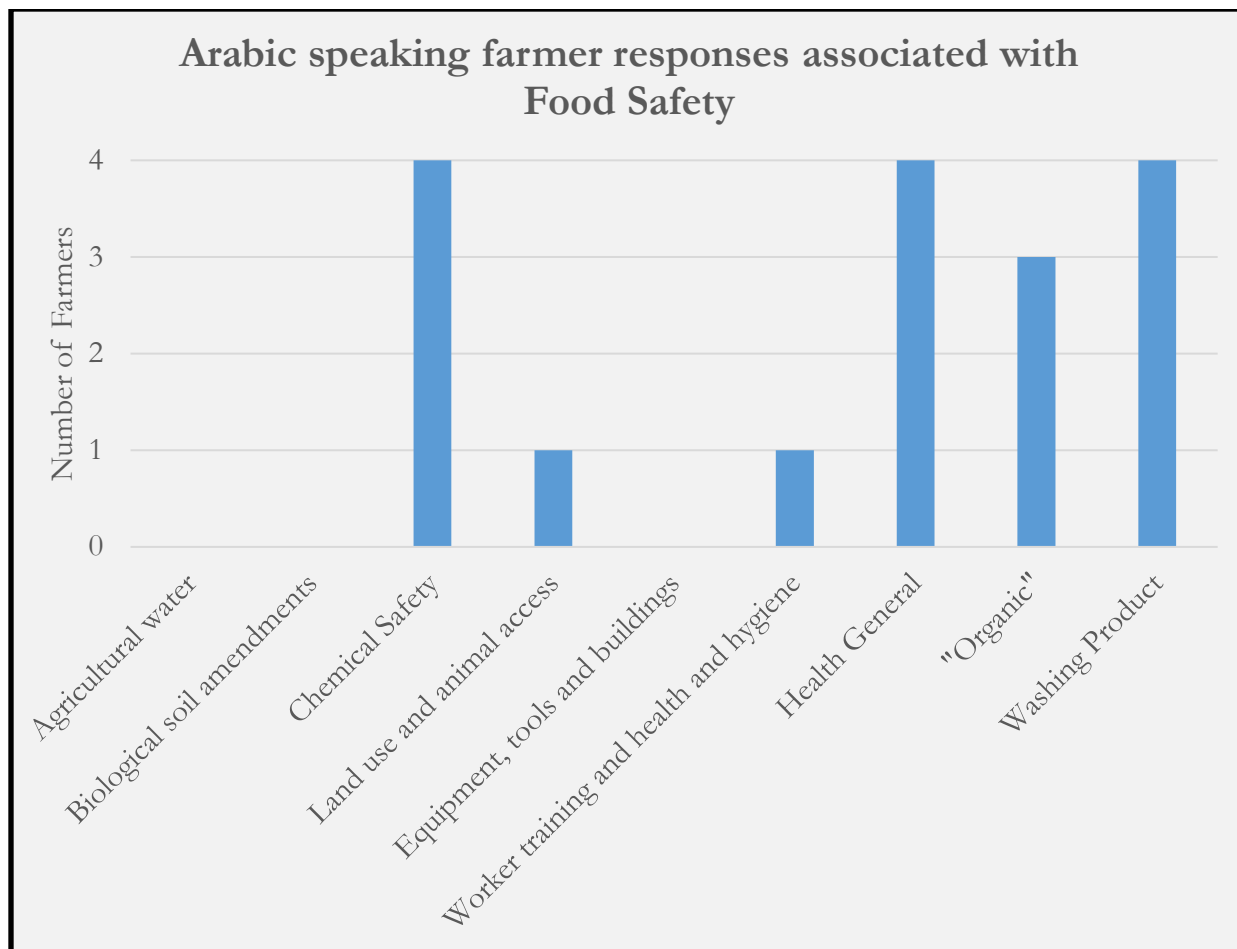


Figure 7 Arabic speaking farmer responses categorized into food safety categories planned for the training and other pertinent food safety categories. Responses based on number of farmers who mentioned the topic area.

Due to the high percentage of Arabic speaking farmers that sell produce (seventy-five percent), incorporating into the food safety training food safety standards - within the planned topic areas - that are demanded by markets (both at IRC NRF farm stands and other retailers or restaurants) could increase the applicability of the training for the growers. Although the number of sales at the NRF food stand likely are low enough to be exempt from FMSA oversight, sharing standards expected in a larger market-scale may be an engaging point for the Arabic speaking group.

In the Arabic speaking farmer group, half of the farmers interviewed were primarily responsible for the farm production, even if there is some sort of family support. Ensuring that these primary growers are attending the training is critical. As mentioned before, because these farmers will bear the responsibility

for implementing new food safety practices, both developing support structures for them in the USDA-funded training and increasing trainer awareness of potential time limitations lead-farmers may have for implementing food safety practices would be beneficial.

With the exception of time and language, Arabic speaking farmers did not consider there to be any barriers to adoption. Considering language as a barrier, and the consistent need for a translator in this group, this indicates a need for training, and training materials, to be delivered in Arabic.

Nepali/Bhutanese farmer group: All farmers in this group mentioned health or healthy (either general good health, their own health, their families' health, or consumer health), life, and not getting sick in correlation to food safety (*Figure 8*). Furthermore, in comparison to the Arabic speaking farmer group, the Nepali/Bhutanese growers mentioned more of a range, beyond chemical impacts on food safety, of farming activities or topic areas associated with food safety. However, again, the term, "bacteria", was only mentioned by one farmer in the Nepali/Bhutanese group, and he was the only farmer to mention bacteria across all farming groups. With four of farmers in the Nepali/Bhutanese group highlighting visual defects – dirt, disease, rotting produce – it is recommended that training addresses a potential gap in knowledge in terms of non-visible pathogen contamination – bacterial and viral. Additionally, the high prevalence (half of the farmers in the Nepali/Bhutanese group) of associating organic as food safe in responses indicates a need to provide training on bacterial and viral pathogens and their vectors as organic growing only pertains to the use of organic inputs. Clearly there is a universal appreciation that food safety is beneficial for health among the Nepali/Bhutanese farmers, elaborating in the planned training on vectors of contamination in produce, and therefore "why" food can become unsafe, and tying this to health outcomes could make the training more impactful and engaging.

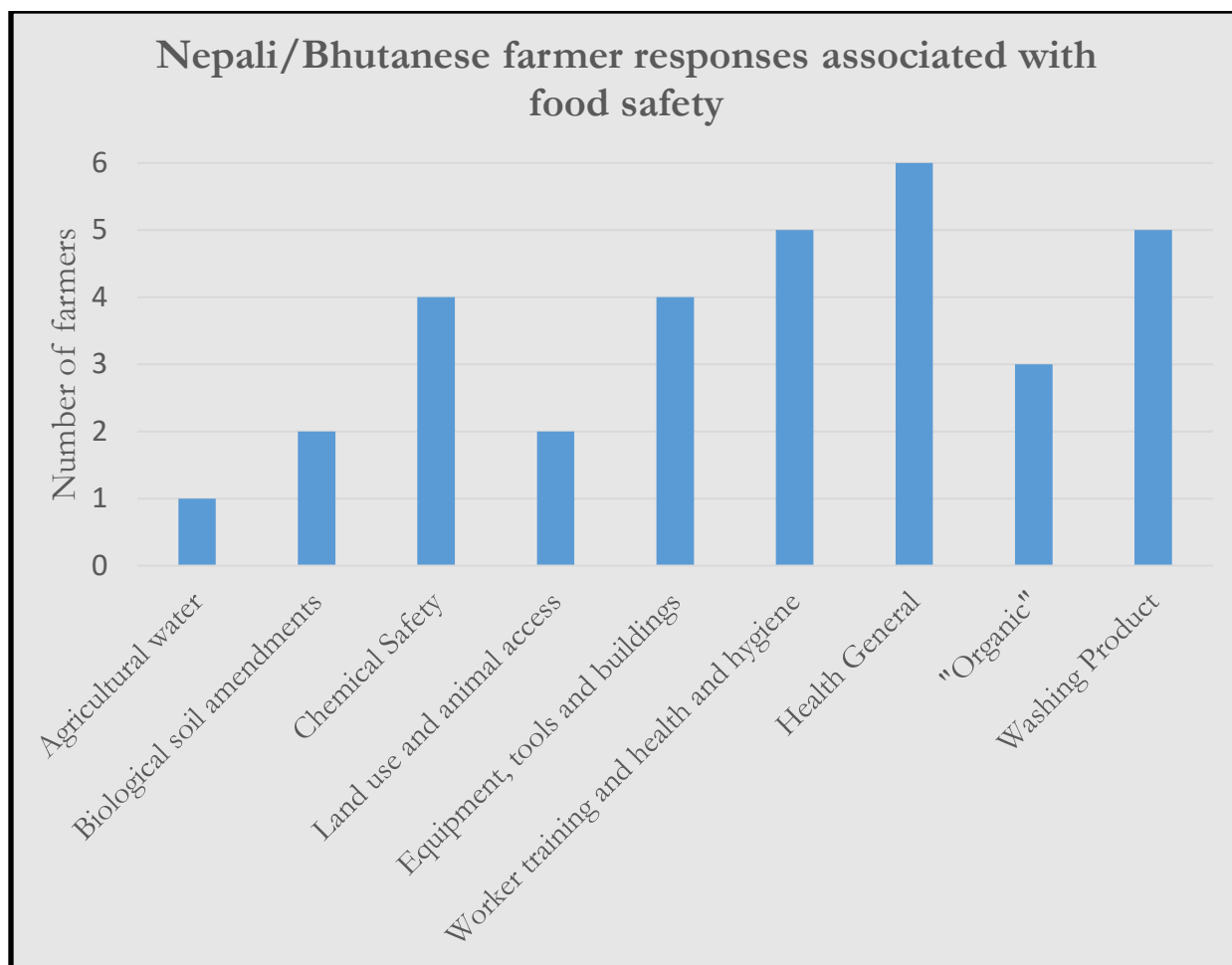


Figure 8 Nepali/Bhutanese farmer responses categorized into food safety categories planned for the training and other pertinent food safety categories. Responses based on number of farmers who mentioned the topic area.

Five of the six Nepali/Bhutanese growers sell their produce, primarily at the NRF fruit and vegetable stand. Again, similar to the recommendation for Arabic speaking group, although the sales at the NRF farm stand are likely below the threshold for FMSA guidelines, and for both the Arabic speaking group and Nepali/Bhutanese group the sale of fruits and vegetables is not their primary source of income – as is likely the case for the lu Mien growers – tailoring training to incorporate commercial food safety expectations, to an extent, in the food safety training could be engaging for these growers.

Four of the six Nepali/Bhutanese growers are the primary or sole operators of their plots, and consequently the implementation of new food safety practices, therefore their specific presence at the

planned food safety training and awareness among trainers that these farmers will bear the responsibility (their time and resources) for implementing new practices are critical. Additionally, four of the six growers did not have any barriers to being more food safe, consequently there is not an indication of a barrier that needs to be accommodated in the training material. With five of the six interviews requiring a translator, and the range in capacity to read English, it is recommended that training material is delivered in English in the USDA-funded food safety training.

[Analysis of food safety responses aggregated across all farming groups](#)

In aggregate, chemical safety or pesticide-use was the predominate correlation to food safety among the refugee farmer groups' responses (*Figure 9*). Along those same lines, "organic" was associated with food safety for close to half of the farmers interviewed. Although washing products after harvest (not technically a unique training topic planned) was referenced by a majority of farmers, other topic areas that could be associated with pathogen contamination were relatively less referenced in comparison to chemical safety among the growers. However, general health and well-being was considered a benefit of food safety by nearly every grower interviewed. Considering these findings, highlighting in the planned training vectors for pathogen contamination (versus chemical contamination) and practices that can reduce the presence of those pathogens, and therefore improve the healthiness of the consumed product, is recommended to provide the reasoning, or the "why", those practices are necessary.

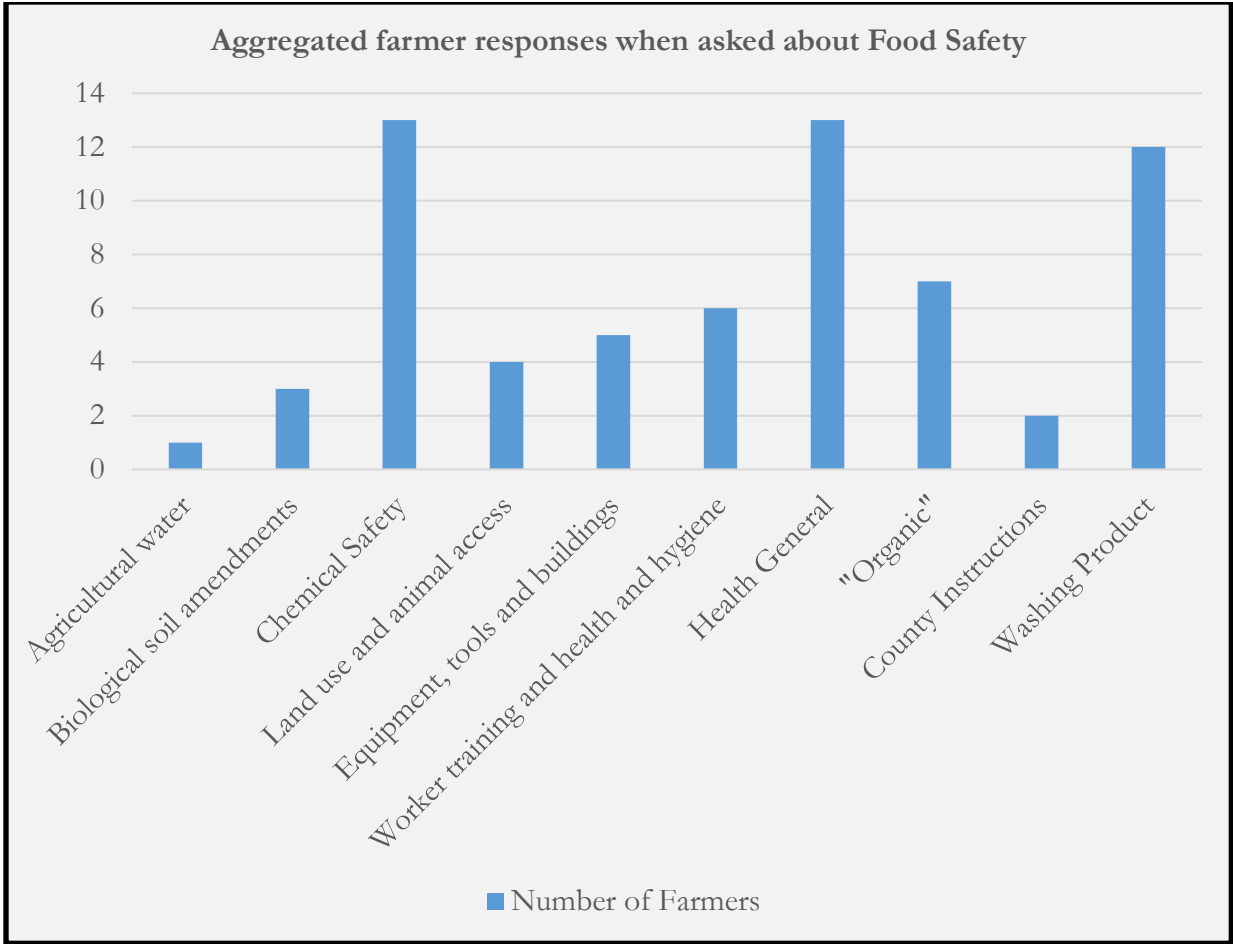


Figure 9 Aggregated farmer responses categorized into food safety categories planned for the training and other pertinent food safety categories. Responses based on number of farmers who mentioned the topic area.

Additional generalized findings across all three groups

During the course of the interviews, some additional findings that fell outside of the categories utilized prior emerged but are valuable to relate. For example, the COVID-19 pandemic, referenced by farmers within all refugee farming groups, could offer an opportunity for some level of cross-fertilization in the planned IRC food safety training as pathogen transfer is a central concern in both instances. Although there was a dearth of responses specifically mentioning terms like “bacteria” or “virus” or “pathogens”, massive public health campaigns to combat the spread of COVID-19 hopefully have illuminated several similar pathways for contracting sicknesses as with foodborne illnesses. Furthermore, food safety

training that highlights how Salmonella Enterica, for example, can contaminate leafy greens, then make someone ill, could reinforce the reasoning for masks and washing hands to prevent the spread of COVID-19.

If content is delivered via video, it would be beneficial for all farming groups to include instruction in the food safety training for participants on how to access the videos or provide a direct, accessible, link to the videos (potentially through text as this method of communication seemed to be preferred to email). The importance of incorporating this information (how to access videos) in the training, or during some face-to-face interaction, was reinforced by a response from NBFarmer60M who commented that he does utilize digital resources but requires assistance from family and friends to conduct the search for those materials on his phone.

All farmers in the Arabic speaking group and the Nepali/Bhutanese farmer groups rely on the IRC NRF farm manager for answering agriculture related questions. This highlights another angle in terms of the food safety training – NRF managers would benefit from a training that is targeted to them in their role as leaders or teachers at the NRFs. It seems likely that post-training, IRC staff, and the IRC NRF farm manager will be a resource for clarification and reminders of concepts and practices disseminated in the food safety trainings.

Results in relation to external food safety extension findings

Food safety extension is challenging, and the findings of my research and the responses of the refugee farmers reinforce many of the challenges already identified in the literature. Beyond the diversity of the participants as refugees from various countries, the refugee farmers in the study all produce fruits and vegetables, which in their own right can demand specific food safety instructions. Researchers conducting food safety extension with Amish vegetable producers not only encountered the challenge of providing food safety guidance for a variety of methods of vegetable production, but also had to

adapt to the fact that Amish growers do not use machinery for production or computers (Kline et al., 2012). These results highlight that diversity in production (organic versus inorganic, mechanical or by hand, for example), in crops, and in access to technology (computers, cell phones) impact both what specific farmers may consider applicable food safety practices and effective methodologies for delivering information or training. Ultimately, outside research has shown that a one-size fits all approach to food safety extension, and regulations, is insufficient. Alternatively, extension needs to be tailored not only to agronomics, but also social, psychological and economic factors uniquely impacting a grower (Parker et al., 2011). This need for a dynamic and diverse approach to food safety extension stands out among the refugee growers interviewed in this study.

Research has shown that for farmer food safety-related behaviors to change, awareness of pathogens, vectors for how they contaminate produce, and their potential harmful effects is critical (Parker et al. 2011). Among all refugees was a general omission of an explicit correlation of food safety with specific types of pathogens, vectors of contamination, and specific consequences on consumers. Therefore, incorporating instruction on pathogens or contaminants and their vectors into the planned instruction would be valuable for providing the reasoning, or the “why” for safety practices are needed.

Furthermore, researchers have determined that increasing the capacity for adult decision-making is critical for adoption of taught food safety practices (Parker et al., 2011). Along with harkening back to Social Cognitive Theory’s framework in terms of self-efficacy, the importance of increasing adult decision-making capacity arguably also calls for a focus on the foundational “why” in the USDA-funded food safety training.

Internationally, the Farmer First Health Paradigm has been promoted for food safety extension (Rezaei, 2018). This specific approach for food safety training was modified from the broader Farmer First Approach initiated in the 1980s which placed the strengths and priorities of farmers at the center of extension training (Chambers et al., 1989). The Farmer First Health Paradigm highlights the potential

negative health impacts of improper food safety practices on the farmer (pesticide-use in particular) and the value of organizing growers for collective food safety action, leveraging social capital (Rezaei, 2018). In this study, all growers and their family members consume the products they grow. Furthermore, highly prevalent in the Lu Mien refugee farmer group is a reliance on learning from peers and within the Arabic speaking and Nepali/Bhutanese refugee farmer groups there is the shared community of growing at NRF locations. Considering these factors, and the applicability of the Social Cognitive Theory in terms of the impact of environment and collective efficacy on learning, the interview responses seem to at least partially support a Farmer First Health Paradigm approach for food safety extension.

Conclusions and Future Research

In this research, I sought to determine the food safety needs, barriers to adoption, learning preferences, and social impact of the refugee groups. Overall, I found that:

- Growers strongly associated topics of pesticide use, chemical use, or organic as important components of food safety, but other topic areas planned for the training were referenced considerably less thus potentially signifying a need, through omission, that the other food safety topic areas need to be highlighted as equally important.
- In terms of the method for delivering the training content, it was evident that refugee farmers learning preferences aligned with the Social Cognitive Theory framework and its emphasis on environment, self-efficacy, modeling, and collective efficacy as drivers of behavior change. Learning from peers or experts, observation or demonstrations, and independent experimentation or use of videos or the internet were the predominant methods of learning both in the past and currently for the growers.
- As no predominant factors regarding barriers to adoption emerged, the lack of a standout barrier to adoption could signify that farmers have the capacity for changing behavior and

adopting new food safety practices, but there could be other reasons why a predominant barrier was not identified.

- In terms of social impact, a majority of the growers considered themselves the lead operators of their plots or farms which is significant both in terms of ensuring their participation in the planned trainings, and respecting the time capacity they have as individuals to enact improved food safety practices.
- The vast majority of the farmers interviewed expressed interest in learning more about food safety – even among those whom consider themselves already food safe. They consider a primary benefit of being food safe to be a better well-being and health for themselves, their family and their customers. This bodes promise? for engagement and attendance for the upcoming IRC food safety training.

The findings from these interviews were synthesized into a report provided to IRC, UC Davis, and CAFF.

Currently, I am collaborating with the lead designer of the training to strategize on the content of the training modules and mode of delivery of material. To determine whether the effectiveness of the training is impacted by collection of information directly from the growers prior to the USDA-funded training, and then integration of that information into the planned training design and delivery, it is recommended that the evaluation surveys funded through the USDA grant incorporate determining questions. The questions could address whether the trainings met the farmers' needs and learning preferences, for example. Furthermore, the survey questions could estimate, to the best extent possible, whether the farmers will adopt new practices learned from the food safety training. The results of the survey ultimately could determine whether incorporating a first step of collecting information from growers, prior to the development and delivery of training material, results in an improved quality of the training and consequently greater adoption of improved food safety practices.

References

- Akhtar, S., Sarker, M., Hossain, A. (2014) Microbiological food safety: a dilemma of developing societies. *Critical Reviews in Microbiology*, 40:4, 348-359. doi:10.3109/1040841X.2012.742036
- Alexander, J., Grover, K., Walters, S. (2020) Exploring Agents' Philosophies of Adult Education and Perceptions of the Role of Extension. *Journal of Extension Volume 58 Number 5*
- Astill, G., Minor, T., Thornsbury, S., Calvin, L. (2019) U.S. Produce Growers' Decision making Under Evolving Food Safety Standards, EIB-210, U.S. Department of Agriculture, Economic Research Service, June 2019
- Bandura, A. (2002) Social Cognitive Theory in Cultural Context. *Applied Psychology: An International Review*, 2002, 51 (2), 269–290
- Bandura, A. (2001) Social Cognitive Theory: An Agentic Perspective. *Annual Review Psychology*, 2001. 52:1-26
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice-Hall.
- Bandura, A. (1977). *Social learning theory*. Englewood Cliffs, NJ: Prentice-Hall.
- Bettis, R. (2010). The iraqi refugee crisis: Whose problem is it? Existing obligations under international law, proposal to create a new protocol to the 1967 refugee convention, & US foreign policy recommendations to the Obama administration. *Transnational Law and Contemporary Problems*, 19, 261–977.
- California Department of Food and Agriculture (CDFA). (2019). *California Agricultural Statistics Review, 2018-2019*. CDFA. <https://www.cdfa.ca.gov/statistics/PDFs/2018-2019AgReportnass.pdf>
- Chambers, R., Pacey, A., Thrupp, L.A. (1989) *Farmer First: Farmer Innovation and Agricultural Research*. Intermediate Technology Development Group of North America.
- Chatterjee, D., Dinar, A., Gonzalez-Rivera, G. (2019) The contribution of the University of California Cooperative Extension to California's agricultural production. *Agricultural Education and Extension Journal, Competence for Rural Innovation and Transformation. Vol. 25, 2019 - Issue 5*. doi:10.1080/1389224X.2019.1656088
- Congressional Research Service. (2020, April 2). Iraqi and Afghan Special Immigrant Visa Programs. <https://fas.org/sgp/crs/homesec/R43725.pdf>
- de Castro, A. B., Krenz, J., & Neitzel, R. L. (2014). Assessing Hmong farmers' safety and health. *Workplace health & safety*, 62(5), 178–185. doi:10.1177/216507991406200502
- Elias, J., & Merriam, S. (2005). *Philosophical foundations of adult education*. Malabar, FL: Krieger.

- Ensor, M. (2016) 'South Sudanese Diasporas: Contested Notions of Childhood, Uprootedness and Belonging among Young Refugees in the US'. In *Contested Childhoods: Growing up in Migrancy*. Marie Louise Seeberg, and Elżbieta M. Goździak, eds. New York: Springer. Pp. 61-81.
- Food and Drug Administration. (n.d.) *Food Safety Modernization Act (FSMA)*
<https://www.fda.gov/food/guidance-regulation-food-and-dietary-supplements/food-safety-modernization-act-fsma>
- Goodkind, J. (2006) Promoting Hmong Refugees' Well-Being Through Mutual Learning: Valuing Knowledge, Culture, and Experience. *American Journal of Community Psychology, Vol. 37, Nos. 1/2, March 2006* doi: **10.1007/s10464-005-9003-6**
- Hadley, C., Patil, C., Nahayo, D. (2010) Difficulty in the Food Environment and the Experience of Food Insecurity among Refugees Resettled in the United States. *Journal for Ecology of Food and Nutrition, 49:5, 390-407, doi: 10.1080/03670244.2010.507440*
- Hu, R., Cai, Y., Chen, K., Huang, J. (2012) Effects of inclusive public agricultural extension service: Results from a policy reform experiment in western China, *China Economic Review, Volume 23, Issue 4, 2012, Pages 962-974, https://doi.org/10.1016/j.chieco.2012.04.014.*
- International Rescue Committee. (September 6, 2018) *New Roots in Sacramento*
<https://www.rescue.org/announcement/new-roots-sacramento>
- Kiptinness, C. & Dharod, J. (2011) Bhutanese Refugees in the United States: Their Dietary Habits and Food Shopping Practices Upon Resettlement. *Journal of Hunger & Environmental Nutrition, 6:1, 75-85*
- Kittle, B. (2013). *A Practical Guide to Conducting a Barrier Analysis*. New York, NY: Helen Keller International
- Kline, T., Kneen, H., Barrett, E., Kleinschmidt, A., Doohan, D. (2012) Adapting Extension Food Safety Programming for Vegetable Growers to Accommodate Differences in Ethnicity, Farming Scale, and Other Individual Factors. *Journal of Extension. February 2012 Volume 50 Number 1 Article Number 1IAW1*
- Kumar, G., Saenger, M., Varma, S., Burleson, M., Kohrt, B., Cantey, P. (2014) Noninfectious Disease Among the Bhutanese Refugee Population at a United States Urban Clinic. *Journal of Immigrant Minority Health (2014) 16:922–925 doi:10.1007/s10903-013-9800-1*
- Merriam, S., & Bierema, L. (2013) *Adult Learning : Linking Theory and Practice*, John Wiley & Sons, Incorporated
- Minato, R. (2004). Hmong Americans. Washington State Commission on Asian Pacific American Affairs Newsletter, 5, 3.
- Miyares, I. (1997) Changing Perceptions of Space and Place as Measures of Hmong Acculturation. *The Professional Geographer, 49:2, 214-224, doi: 10.1111/0033-0124.00071*
- Morrice, L. (2012) Learning and Refugees: Recognizing the Darker Side of Transformative Learning Adult Education Quarterly 63(3) 251 –271. doi: **10.1177/0741713612465467**

- Parker, J., Wilson, R., LeJeune, J., Rivers III, L., Doohan, D. (2012) An expert guide to understanding grower decisions related to fresh fruit and vegetable contamination prevention and control. *Journal of Food Control* 26 (2012) 107e116. doi:10.1016/j.foodcont.2011.12.025
- Pfeifer, M. E., Sullivan, J., Yang, K., & Yang, W. (2012). Hmong population and demographic trends in the 2010 census and 2010 American community survey. *Hmong Studies Journal*, 13, 1-31.
- Rezaei, A. (2018) Food safety: The farmer first health paradigm. *One Health* 5 (2018) 69–73 <https://doi.org/10.1016/j.onehlt.2018.04.001>
- Schunk, D. H. (1996). *Learning Theories: An Educational Perspective (2nd ed.)*. Englewood Cliffs, NJ: Merrill.
- Stenvig, T., Carson, P., Randall, R., Bohn, M. (2018). Transitions of South Sudanese Refugees: Reaching for a Better Life. *Journal of Refugee Studies*. 31. 664-686. doi: 10.1093/jrs/fey008.
- Tan, R. (2020, January 20). New to the country, veterans of the land. *The Washington Post*. Retrieved from https://www.washingtonpost.com/local/maryland-news/new-to-the-country-veterans-of-the-land/2020/01/21/ee61c13e-3250-11ea-91fd-82d4e04a3fac_story.html
- Thao, C., Burke, N., Ha, S., Joyce, A. (2019) Pesticide Knowledge, Attitudes, and Practices Among Small-Scale Hmong Farmers in the San Joaquin Valley of California. *Journal of Integrated Pest Management*, Volume 10, Issue 1, 2019, 32, <https://doi.org/10.1093/jipm/pmz030>
- Trieu, M., Vang, C. (2015) A Portrait of Refugees from Burma/Myanmar and Bhutan in the United States *Journal of Asian American Studies*, Volume 18, Number 3, pp. 347-369 <https://doi.org/10.1353/jaas.2015.0029>
- US Department of Agriculture (n.d.) <https://ask.usda.gov/s/article/What-does-food-safety-mean>
- US Department of State (2016) Refugee Admission Statistics, <http://www.state.gov/j/prm/releases/statistics/> (accessed 30 June 2020).
- United Nations High Commissioner for Refugees (2007). Convention and protocol relating to the status of refugees. Geneva, Switzerland
- United Nations High Commissioner for Refugees (2015a) ‘Annex’. UNHCR Refugee Resettlement Trends—2015, p. 26, [http://www.unhcr.org/en-us/protection/resettlement/559ce97f9/unhcr-refugee-resettlement-trends-2015.html?query¼Refugee Resettlement Trends](http://www.unhcr.org/en-us/protection/resettlement/559ce97f9/unhcr-refugee-resettlement-trends-2015.html?query¼Refugee%20Resettlement%20Trends)
- United Nations High Commissioner for Refugees (n.d.) *Refugees in America* <https://www.unrefugees.org/refugee-facts/usa/>
- United Nations High Commissioner for Refugees (n.d.) *Iraq Refugee Crisis* <https://www.unrefugees.org/refugee-facts/usa/>
- Vonnahme, L., Lankau, E., Ao, T., Shetty, S., Cardozo, B. (2015) Factors Associated with Symptoms of Depression Among Bhutanese Refugees in the United States. *Journal of Immigrant Minority Health* (2015) 17:1705–1714 doi:10.1007/s10903-014-0120-x

Whitehead, D. (2001) A social cognitive model for health education/health promotion practice. *Journal of Advanced Nursing*, 36: 417-425. <https://doi.org/10.1046/j.1365-2648.2001.01973.x>

Yako, R. & Biswas, B. (2012) We came to this country for the future of our children. We have no future”: Acculturative stress among Iraqi refugees in the United States. *International Journal of Intercultural Relations* 38 pp. 133– 141 <http://dx.doi.org/10.1016/j.ijintrel.2013.08.003>