Food Safety Outreach Program

National Project Directors Meeting

LRCC Lead Regional Coordination Center

USDA National Institute of Food and Agriculture
U.S. DEPARTMENT OF AGRICULTURE

NECAFS The Northeast Center to Advance Food Safety

SC Southern Center for Food Safety Training, Outreach and Technical Assistance

North Central Region Center for FSMA Training, Extension and Technical Assistance

WRC Western Regional Center to Enhance Food Safety

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USDA NIFA
Food Safety Outreach Program
National Project Directors Meeting

May 25-26, 2022
Orlando, Florida

Welcome to the USDA NIFA National Food Safety Outreach Program National Project Directors Meeting. Over the next two days, the Lead Regional Coordination Center (LRCC) and four regional centers (Southern (SC), North Central (NC), Northeast (NECAFS), and the Western (WC)) will host FSOP grant awardees from around the country, both virtually and in person, as they discuss their accomplishments and success stories. Additionally, each of the four regional centers will provide an update on regional activities and projects. There will be an overview and update on the FSOP program from the USDA NIFA representatives. We hope that you will take some time to review this book of abstracts, in addition to joining this meeting. On Wednesday, we'll hear from awardees from the Northeast, Southern, and North Central Regional Centers and participate in breakout sessions. We'll get updates from associations and the Western Regional Center round out our meeting on Thursday. Despite being a hybrid meeting of virtual and in person, we hope that you will benefit from this meeting and enjoy hearing about all of the incredible work performed around the country by so many dedicated food safety educators. Thank you for joining us!

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Stephanie Brown, WRCEFS Coordinator
Oregon State University

Food Safety Outreach Program National Project Directors Meeting
May 25-26, 2022
Wyndham Lake Buena Vista
Orlando, Florida

May 25, 2022 Agenda			
Time (ET)	Title	Presenter	Institution
8:00	*Morning Refreshments Available*		
8:30	Welcome and Overview of Meeting	Keith Schneider	University of Florida, LRCC
8:35	CONTACT Team	Laura Strawn and Alexis Hamilton	Virginia Tech
8:40	Updates from USDA-NIFA	Courtenay Simmons and Jodi Williams	USDA-NIFA
Northeast Center to Advance Food Safety			
9:00	Regional Center Update-NECAFS	Chris Callahan	University of Vermont
9:15	Training and Technical Support to Help Small Vegetable Farms Meet the Cleaning and Sanitization Requirements of the Produce Safety Rule	Chris Callahan	University of Vermont
9: 30	Infotoons and Videos as Delivery Tools for Food Safety Training	Robson Machado	University of Maine
9:45	Fruits, Vegetables and FSMA Compliance: Multilingual Audiovisual Food Safety Training for Farms and Packinghouses	Betsy Bihn	Cornell University
10:00	Sanitation Control Practitioner Program (SCPP) – The Development Of An Education Sanitation Program For Small Processors Project	Stephanie Cotter	University of Massachusetts
10:10	Small and Medium Processor Costs of Preventive Controls Compliance*	Jill Fitzsimmons	University of Massachusetts Amherst
10:20	Year one of TRAIN: Targeted Resources Addressing Identified Needs in Maryland worker food safety training via on-farm piloting of a mixed media toolkit*	Shauna Henley	University of Maryland Extension
10:30	*Break*		
Southern Center for FSMA Training			
10:50	Regional Center Update-SC	Michelle Danyluk	University of Florida
11:05	Experiential Learning Opportunities for Limited Resource Growers through Mobile Farm Innovation in	Kristin Woods	Auburn University

	Mississippi, Alabama, and Georgia		
11:20	Food Safety Training to Support Technical Assistance for Small and Mid-Sized Farmers	Juliana Ruzante	RTI International
11:35	Development and Implementation of a Hands-on Food Safety and Regulatory Curriculum for Members of Shared-Use Commercial Kitchens in Florida	Matt Krug	University of Florida
11:50	Enhancing Food Safety Outreach to Underrepresented Communities through Food Microbiology and Soil Amendments Related Hands-On Workshops*	Armitra Jackson-Davis	Alabama A&M University
12:00	Our Road to Safe and Healthy Food Podcast Project	Juan Carlos Rodriguez	Florida Organic Growers
12:10	Building a Food Safety Training Program to Empower Disadvantaged Producers in Alabama	Janice Hall	Auburn University
12:20	*Lunch*		
North Central Region			
1:30	Regional Center Update-NCR	Angela Shaw	Iowa State University
1:45	Water Quality and the FSMA PSR: Developing Risk Assessment and Educational Tools for Farmers and Laboratories in the Upper Midwest	Annalisa Hultberg	University of Minnesota Extension
1:55	Food Safety Needs Assessment of Produce Drying: From Human Factor Perspectives	Betty Feng	Purdue University
2:05	Customizing Current Good Manufacturing Practices Training and Education for Small and Very Small Food Facilities across the United States	Byron Chaves	University of Nebraska-Lincoln
2:15	Lincoln University Culinary Incubator improves the lives of the underserved with food safety knowledge, awareness, and compliance for new food businesses*	Cindy Borgwordt	Lincoln University
2:25	Development and implementation of a customized and culturally sensitive FSMA supplemental training program	Pei Liu	University of Missouri-Columbia

	for Hmong farmers: A community outreach project		
2:35	Assisting Small- and Medium-Sized Farmers through Cross-State Collaboration	Tricia Wancko	National Farmers Union
2:45	Food safety education and outreach programming for plain growers (Amish and Mennonite)*	Sanja Ilic	The Ohio State University
2:55	*Break*		
3:15	Instructions for Breakout Groups	Chris Callahan	University of Vermont
3:20	Breakouts		
4:20	Breakout Report Out		
5:00	End Presentations Day 1		
5:15	Formal Poster Session and Reception		
6:15	End Day 1		

May 26, 2022 Agenda			
Time (ET)	Title	Presenter	Institution
8:00	*Morning Refreshments Available*		
8:30	Day 2 Welcome	Keith Schneider	University of Florida
8:40	USDA Program Overview	Courtenay Simmons	USDA-NIFA
8:50	Regional Centers Evaluation Update*	Amy Harder	University of Florida
9:20	Updates from Associations • Produce Safety Alliance • Indigenous Food and Agriculture Initiative • Food Safety Preventive Controls Alliance*	• Betsy Bihn • Will Seeley • Jason Wan	• Produce Safety Alliance • Indigenous Food and Agriculture Initiative • Food Safety Preventive Controls Alliance
10:35	Break		
Western Regional Center to Enhance Food Safety *Session Moderator: TBD*			
11:00	Regional Center Update-WRCEFS	Jovana Kovacevic	Oregon State University
11:15	Latino Immigrant Farmers Trained in Organic Farm Food Safety (LIFT OFFS)	Nathan Harkleroad	Agriculture and Land-Based Training Association
11:30	Expanded Refugee and Immigrant Food Safety Outreach Project in Sacramento	Tristan Hudak	International Rescue Committee
11:45	Food Safety Education for Korean Speaking Specialty Fruit Growers in California	Andrew Park	California Center for Cooperative Development; iFoodimports.com
12:00	Supporting Underserved California Leafy-Green Producers' FSMA Compliance, through Interdisciplinary Food Safety, Communication and Marketing Training	Karen Cannon	California Polytechnic State University
12:15	Colorado Produce Safety Collaborative: Regionally Adapted Training and Outreach	Martha Sullins	Colorado State University
12:30	Closing Remarks	Keith Schneider	University of Florida
12:40	Boxed Lunch Available		

*-update will be delivered through a prerecorded presentation

Abstracts

Listed alphabetically by reported Project Director's Last Name (noted in bold)

Title: **Develop and Deliver Hands-On Training to Evaluate and Reduce Microbial Food Safety Risk Associated with Agriculture Water**

Author(s): **Achyut Adhikari**, Louisiana State University AgCenter
Kathryn Fontenot, Louisiana State University AgCenter
Melissa Cater, Louisiana State University AgCenter
Fatemeh Malekian, Louisiana State University AgCenter

The Food Safety Modernization Act (FSMA) Produce Safety Rule (PSR) requires that all agricultural water must be safe and of adequate sanitary quality for its intended use. Several methods are currently available for water treatment, such as chlorination, chlorine dioxide, ozone, filtration, and UV treatments. However, not all the methods are suitable for on-farm surface water treatment due to their complexity and variability in effectiveness. Fruit and vegetable producers using surface water to irrigate crops are required to have appropriate water treatments in place that do not leave any chemical residue. The overall goal of this project is to reduce the food safety risk associated with the surface water source in Louisiana. A mobile water treatment unit is developed to demonstrate the proper treatment of irrigation water using UV-C light and chemical sanitizers (chlorine and Peroxyacetic acid). A curriculum on agricultural water sampling and treatment and several educational materials were developed to educate the growers on how to collect water samples and treat irrigation water properly. Two field days and three water treatment and sampling workshops with participation from >150 farmers and extension agents were organized around Louisiana. The field day and workshop focused on produce safety, agricultural water treatments, and on-farm food safety risk assessment. The mobile unit was used as a demonstration for several water treatment techniques. All participants were 100% satisfied with the training and almost all attendees >96% indicated their knowledge on agricultural water safety increased to a high or very high level. Louisiana farmers, regulators, extension agents, and students received hands-on experience in agricultural water sampling and treatment techniques and increased their knowledge on food safety risk associated with Agriculture water.

Title: **Develop and Deliver On-Farm Biological Soil Amendment of Animal Origin Course Integrated with Hands-On Training**

Author(s): **Achyut Adhikari**, Louisiana State University AgCenter
Kathryn Fontenot, Louisiana State University AgCenter
Karuna Kharel, Louisiana State University AgCenter

Animal waste or byproduct are an important source of human pathogens. Several research has been published highlighting the risk assessment and proper usage of Biological Soil Amendment of Animal Origin (BSAAO). It is essential to have a curriculum on biological soil amendment in the understandable form and at least a basic level training on a regular basis at the grower level. The objective of this project is to develop and deliver BSAAO course integrated with hands-on training. A curriculum for “Composting for Food Safety” workshop and a composting demonstration site equipped with small and medium size composting process/equipment was developed at the LSU AgCenter Botanical gardens in Baton Rouge. A pilot course on the two-day workshop with hands on activities was completed with 30 participants including growers, state regulators, extension agents and students. Twelve factsheets and five videos on composting series which were published online on the newly developed LSU AgCenter composting webpage. All participants were 100% satisfied with the training and >90% indicated their knowledge on BSAAO requirement and >95 indicated their knowledge on biology of compost and composting process increased to a high or very high level. Social media platforms (Facebook, Twitter, and Instagram) were actively used to share food safety educational materials with our stakeholders that gained 23045 engagement and reached 232,574 people in one year. The workshop and educational materials promoted a greater understanding of the safe use of BSAAO to minimize the risk of contamination and help prevent adulteration with fresh produce on covered farms in Subpart F of the Produce Safety Rule.

Title: **Multi-Modal Dairy Food Safety Plan Education to Support Small and Medium Dairy Producers**

Author(s): **Samuel Alcaine**, Cornell University
Jovana Kovacevic, Oregon State University
Joy Waite-Cusic, Oregon State University
Stephanie Brown, Oregon State University
Clint Stevenson, North Carolina State University

Consumer interest in artisanal dairy products, like fluid milk, cheese ice cream, and yogurt, continues to increase across the country. While this demand has led to the growth of large number of small and medium size dairy businesses, many are resource limited and may lack the capital and technical expertise to implement robust food safety programs. Foodborne outbreaks continue to be associated with some artisan dairy products, and this highlights the need to ensure that effective and accessible food safety education programs are available. Many programs, like the FSPCA Preventive Controls for Human Foods, provide a forum to understand regulations and the basic food safety plan concepts, but many small dairy producers find it challenging to develop and implement food safety plans compliant with the Food Safety Modernization Act (FSMA). Furthermore, due to the wide distribution of small dairy producers, access to classes is often limited by geography, time, and cost. We aim to build a multi-modal food safety plan education program that leverages synchronous and asynchronous content, in virtual and in-person platforms, to deliver an affordable, customizable, and engaging education wherever dairy producers reside. Specifically our goals are to: (i) provide online, asynchronous, dairy food safety plan training videos and materials; (ii) provide regular online, synchronous, dairy-relevant food safety office hours with food safety experts; (iii) build and maintain a Dairy Wiki; and (iv) link virtual dairy food safety to in-person communities via food safety training sessions that are held in conjunction with dairy conferences. This program will build upon the learnings and collaborative educator network built through our previous, national dairy food safety coaching workshop series. This program will create a new educational platform that supports small dairy producers in their efforts to develop and implement food safety plans and produce safe, wholesome products for US consumers.

Title: **Our Road to Safe and Healthy Food Podcast Project**

Author(s): **Ramkrishnan Balasubramanian**, Florida Organic Growers
Juan Rodriguez, Florida Organic Growers
Keith Schneider, University of Florida
Michelle Danyluk, University of Florida

Food safety educational materials and learning opportunities to educate farmers about the Food Safety Modernization Act (FSMA) regulations may not always be readily accessible to all farmers. Many of the formal trainings that have been used to provide information to farmers about these food safety regulations are designed to be delivered as in-person workshops or short courses to farmers at specific times and locations during the year. The purpose of our project is to create and provide FSMA-related educational content that will be more accessible to new and beginning farmers and experienced farmers who live far from workshop sites, and who have often had difficulties or challenges preventing them from traveling far from their farms. FOG conducted focus groups and interviews with farmers in Florida to identify the relevant food safety topics that farmers believed they must understand better to comply with FSMA regulations. Their responses were used to design content for a podcast and webinar series to inform and educate them about these topics. A total of 10 podcast episodes and 5 webinars were created and made available through FOG's website. Topics covered in the series ranged from "Microbiology of Foodborne Pathogens and Their Effect on Food Safety" to "Farm Food Safety Audits" to "On Farm Readiness Reviews-Farmers and Inspector Perspectives." Webinars were supplemental to the podcast and served to expand on the information deemed useful to farmers. The live aspect of the webinars allowed for participant interaction, and the pre-recorded webinar format allowed for increased flexibility for knowledge sharing by experts. By providing an alternative option for farmers to learn about FSMA regulations, the Road to Safe and Healthy Food Podcast Project innovated how we may deliver useful information to farmers. These methods can positively influence how farmers obtain information about FSMA and make food safety related decisions.

Title: **A Virtual Food Safety Education and Outreach Platform for Small and Very Small Farms**

Author(s): **Pratik Banerjee**, University of Illinois, Urbana-Champaign
Irshad M. Sulaiman, U.S. Food and Drug Administration
Goutam Banerjee, University of Illinois, Urbana-Champaign

The development of customized food safety education that caters to target specific audiences is critical to the overall mission and purpose of FSMA. Creating an effective program that will address the food safety educational needs of traditionally resource-limited communities is essential to safeguard the health aspect of the consumers and for the greater good of public health. Information technology-driven online educational efforts across the country are critical in food safety knowledge dissemination. The overall goal is to deliver customized training to beginning farmers, mid-sized farms, small fresh fruit and vegetable merchant wholesalers, and socially disadvantaged farmers in Illinois. We developed 15-20 minute-long *on-demand* educational modules on various FSMA topics, including Food Safety Plan (FSP), Good Agricultural Practices (GAPs), basics of Produce Safety Regulations (PSR). The modules are presented in plain and straightforward language on an online content delivery platform – the so-called "Virtual Food Safety Outreach Platform at Illinois" (VFSOPI), which will enable engaging small and very-small, underserved growers. The integration of the VFSOPI with Illinois Extension's Moodle is ongoing, enabling delivering the customized food safety outreach program to the stakeholders. The COVID-19 pandemic posed a significant challenge for accomplishing in-person interactions. It was impossible to arrange in-person workshops due to Federal, State, and local public health advisories. However, we are planning to conduct an in-person, hands-on workshop that will be offered soon. In addition, the project has provided opportunities to increase the number of FSMA Produce Safety Alliance (PSA) certified trainers (resulting in four additional PSA trainers) within the Illinois Extension system.

Title: **Fruits, Vegetables and FSMA Compliance: Multilingual Audiovisual Food Safety Training for Farms and Packinghouses**

Author(s): **Elizabeth A. Bihn, Ph.D.**, Cornell University
Travis Chapin, M.S., University of Florida
Trevor Suslow, Ph.D., University of California, Davis

The FSMA Produce Safety Rule introduced new requirements for worker health and hygiene training. All personnel who touch food-contact surfaces or handle covered fruits and vegetables, and their supervisors, must attend training and practice proper hygiene to prevent produce contamination with microorganisms of public health significance. The purpose of this project is to develop multilingual (English, Spanish, Hmong, Haitian Creole) food safety educational videos to support training programs for farm and packinghouse workers that include the new Produce Safety Rule requirements. For this project, footage was collected from fruit and vegetable farms and packinghouses in CA, FL, and NY to show the diversity of produce crops and production practices to highlight the importance of food safety regardless of farm size, commodities grown, region, or type of production and packing practices used. This will result in three multilingual training videos including one focused on practices in fields, one focused on practices in packinghouses, and one focused on preparing managers to be food safety leaders. The best way to ensure daily implementation of food safety practices is to develop an operation-wide food safety culture. Building food safety culture requires providing training and resources so everyone can be involved in food safety. Effective training builds confidence and competence in employees so they know how to properly implement food safety practices to reduce microbial risks. Ensuring a safe and wholesome supply of fresh fruits and vegetables is important for meeting the dietary needs of consumers, keeping farms and packinghouses economically prosperous, and meeting food production needs.

Title: **Lincoln University Culinary Incubator Improves the Lives of the Underserved with Food Safety Knowledge, Awareness, and Compliance for New Food Businesses**

Author(s): **Cindy Borgwordt**, Lincoln University

The underserved face challenges that prevent them from starting a new food business, making value added food, and lacking an affordable place to do business. The Lincoln University Culinary Incubator project targets the underserved with business development support, food safety trainings and consulting and offering an inspected facility at a reasonable cost. We nurture clients with business plan development including budgeting, marketing, ingredient and packaging sourcing, special processing requirements, and marketing. Due to Covid 19 challenges, we have opted for online trainings. We have currently offered FSMA and related trainings to over 15 members, whom are at various stages of business development. Trainings have included Food Safety Manager, Food Safety Preventative Control, Better Process School, Produce Safety and related. Over 30 non-member food businesses have been consulted and over 300 persons have had food safety questions addressed. Outreach efforts have reached over 500 persons including networking, conferences, and farmer's market booths. Outcomes have been an increase in FSMA trained clients, food safety knowledge and awareness of laws and compliance and local food made safely. Key outcomes include improving the lives of the underserved, increasing food safety knowledge and compliance.

Title: **Diversified Farm FSMA Training Initiative**

Author(s): **Kim Butz**, Carolina Farm Stewardship Association
Kali Feiereisel, Community Alliance with Family Farmers
Kelly Mae Nuckolls, National Sustainable Agriculture Coalition

Current Produce Safety Alliance (PSA) training does not provide a comprehensive approach to meet the needs of small farms that use conservation-focused, sustainable, regenerative, and organic practices. This is especially true of farms operated by beginner and socially disadvantaged farmers that distribute their produce in local and regional food markets.

The traditional method for delivering food safety training has been to provide a standardized curriculum in a classroom setting or an online distance learning platform. This approach does not give the participant hands-on practice that shows them the "how-to" for implementing the required food safety practices but instead only describes what practices are required by the FSMA Produce Safety Rule. To better educate producers on the fundamentals of food safety, there needs to be a scale-appropriate, culturally sensitive, PSA-equivalent alternative curriculum specifically for this demographic of farmers.

The objective of the Diversified Farm FSMA Training Initiative curriculum is to prepare producers to meet specific third-party standards and regulatory requirements related to the Produce Safety Rule. We will do this by launching an FDA-approved PSA-equivalent training program nationwide. It will include a training curriculum for farmers and trainers and an administration plan to serve institutions and organizations teaching the PSA-equivalent training. The alternate training curriculum will provide the growers with examples of implementing the practices taught through hands-on activities, demonstrations, training, and documentation language drafts.

One Train the Trainer course will be conducted for 20 trainers, and six will be conducted for 120 farmers. Program participants will be required to complete an evaluation at the end of the course to determine the course's effectiveness. The curriculum and training courses will be evaluated using a TOP Model approach. Evaluation results will be used to improve program implementation continually.

Title: **Colorado Produce Safety Collaborative: Regionally Adapted Training and Outreach (September 2019-March 2022)**

Author(s): **Adrian Card**, Colorado State University Extension
Beth LaShell, Fort Lewis College
Martha Sullins, Colorado State University Extension
Harrison Topp, Rocky Mountain Farmers Union

The Colorado Produce Safety Collaborative is a multi-organizational team working throughout the state to produce a continuum of education around produce safety planning, practices, and regulation focused on specific regional needs. This educational approach is designed to increase produce growers': 1) understanding of produce safety as a key business risk; 2) knowledge about the Food Safety Modernization Act, Produce Safety Rule, new risk management tools and regulatory updates; 3) ability to implement tools and risk management strategies; and 4) community connectivity via an advisory board, regional tours and mentorships. Although the project was designed based on evaluation data collected from 2015-2018, we adjusted our approach based on data collected in 2019 from Colorado produce growers who had participated in on-farm readiness reviews (OFRRs). We have determined that OFRRs more accurately demonstrate what growers have learned and can put into practice. Our project accomplishments over the 3-year period include: 1) teaching introduction to produce safety courses delivered in 7 locations to 85 growers; 2) understanding the Produce Rule by teaching 12 PSA Grower Training courses (7 in-person in 6 locations and 5 virtual) to 194 individuals and delivering 4 regulatory update sessions (2 webinars and 2 in-person) to 55 growers; 3) providing 9 webinars on new risk assessment and management tools, and providing 4 advanced technical workshops on key produce safety risk management strategies. The team also produced one webinar and one workshop on preparing for a successful GAP audit. Although we convened an advisory board and formed a mentoring program, only one grower applied to be mentored and we received no applications for mentors. This signaled to us that Colorado growers are still more comfortable receiving information and acting on it individually but not yet as part of a community of growers supporting each other in building produce safety practices.

Title: **PHASE II. FSMA Experimental Learning Outreach Program for Socially Disadvantaged Farmers in Rural Alabama, Georgia, and Mississippi**

Authors: **E'licia Chaverest**, Alabama A&M University Small Farms Research Center
Duncan Chembezi, Alabama A&M University Small Farms Research Center
Carolyn Banks, Alcorn State University
Terrence Wolfork, Fort Valley State University
Joshua Dawson Fort Valley State University

Alabama A&M University (AAMU) Small Farms Research Center has over 25 years of experience working with limited resource socially disadvantaged minority farmers, cooperatives, agribusinesses, and faith-based organization in the southern region specifically Alabama, Georgia, Tennessee, and Mississippi. Our overall mission is to assist our target audience by providing outreach and technical assistance, minimizing agricultural risk, educating them on sustainable agriculture practices and USDA government programs and services, and assisting them in making their farm operation more profitable. For this project titled, "Phase II. FSMA Experimental Learning Outreach Program for Socially Disadvantaged Farmers in Rural Alabama Georgia, and Mississippi" AAMU Small Farms Research Center will continue to train farmers on good agricultural practices, Produce Safety Alliance (PSA) Growers Training, farm-to-table food safety programs, and extend the PSA Train-to-Trainer program by educating extension agents and fellow farmers. The experimental learning outreach program will be executed with the collaboration of two 1890 universities (Alcorn State University and Fort Valley State University) with a rich history of educating and empowering socially disadvantaged farmers and under-served communities. In order for limited resource, socially disadvantage minority farmers to compete in the current food system, Food Safety Moderation Act (FSMA) training plays a vital role for the success of their farm operation. With the many racial and economic barriers faced by limited resource, socially disadvantaged minority farmers, this project lead by AAMU Small Farms Research Center in collaboration with our partners will provide hands-on food safety demonstration, case studies, facility and farm tour visits, and additional resources available to farmers. Through this project partners will educate and train (375) small, limited resource socially disadvantaged farmers, new and beginning producer, immigrants, veterans, and extension agents.

Title: **Customizing Current Good Manufacturing Practices Training and Education for Small and Very Small Food Facilities across the United States**

Authors: **Byron Chaves**, University of Nebraska-Lincoln
Jennifer Acuff, University of Arkansas
Nicole Richard, University of Rhode Island
Luis Sabillon, New Mexico State University

cGMP outline the minimum sanitary, environmental, and operational standards that a food processing facility must meet to manufacture, process, pack, or hold food in a safe and wholesome way. The long-term goal of this project is to improve the capacity of small and very small food facilities across the U.S. to comply with current cGMP regulations. We propose to (1) Conduct cGMP compliance readiness assessments in small and very small food facilities in four different U.S. geographical regions; (2) Determine cGMP preferred training and education delivery methods for food workers in small and very small food facilities across the U.S.; (3) Examine barriers to the consistent and sustainable implementation of cGMP in small and very small food processing operations across the U.S.; (4) Reconcile the content of GMP training and education materials with the most commonly reported GMP violations in food processing operations; and (5) Customize, develop, and/or expand current cGMP training materials in English and Spanish suitable for small and very small food manufacturers across different U.S. geographical regions. Surveys, onsite visits, interviews, and needs assessments will be used to collect data for objectives 1, 2, and 3 that will inform objectives 4 and 5. Facilities within each state are being selected using the FDA Dashboard inspection website to identify geographical and commodity diversity within each state. Preliminary readiness assessment results are expected in late 2022. The results will be shared with facilities in the form of a visit report and compared over time as the operations are visited once more within one year period.

Title: **Improving the Development of Food Safety Plans Through The "Advanced Preventive Controls School" Initiative**

Authors: **Byron Chaves**, University of Nebraska-Lincoln
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Food manufacturers require continuous training beyond the foundational PCQI course. The long-term goal of this project is to build capacity to develop and implement adequate food safety plans. We propose to: 1) Develop an advanced preventive controls for human food training curriculum; 2) Implement the "advanced preventive controls school" training initiative in Nebraska, Guam, and Puerto Rico; 3) Measure the impact of advanced training on the participants' FSMA PCHF foundational knowledge, attitudes, practices, and ability to develop and implement a food safety plan; and 4) Identify future training needs of food manufacturers in the U.S. Central Plain Region, Guam, and Puerto Rico. The advanced curriculum is divided into four modules: hazard analysis and risk assessment, validation of process preventive controls, effective food allergen management, and pathogen environmental monitoring. Implementation of this project has been severely interrupted by travel restrictions due to the COVID-19 pandemic. The curriculum is mostly completed, with pilot sessions already offered in Nebraska and the region. Training sessions in Guam and Puerto Rico are being scheduled. One intern from Puerto Rico spent 4 months in Nebraska learning about food safety extension and taking the lead on some of the materials. Four more interns, two from each territory, are being recruited to come to Nebraska and work with faculty under this project for three months each. As travel restrictions lighten, our insular collaborators are finally able to attend meetings in the continental US included in the project, such as IAFP 2022. Ultimately, we hope to establish meaningful connections with industry, faculty, and students in Guam and Puerto Rico to increase capacity and identify future training needs and opportunities. This requires in-person connections, which has been very challenging over the last two years.

Title: **Assessment of the Effectiveness of a Piloted Online Delivery of Current Good Manufacturing Practices for Small Food Processor in Iowa**

Author(s): **Shannon Coleman**, Iowa State University
Melissa Cater, Louisiana State University
Kathrine Gilbert, Iowa State University
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Implementing best practices for compliance with Current Good Manufacturing Practices (cGMPs) is critical for a small food processor. This is primarily due to the requirement that these processors know about this prerequisite program before gaining their food processor license. This study's objective was to assess participants' attitudes, perceptions, intentions, and behavior towards food safety practices using the four constructs from the Theory of Planned Behavior. Thirty-two participants enrolled and completed an online pilot module on cGMPs. The effectiveness of the online module was measured by examining participants at pre-and post-program. Descriptive statistics (frequency, percentage, mean, and standard deviation) and Wilcoxon signed-ranks tests were used for the analysis. Thirty-two people (females: n=20; 69%; males: n=9; 31%; race: white, n=24, 88.9%; Hispanic, n=2, 7.4%; African American, n=1, 3.7%; Age: M=42.0, SD=13.0) completed pre and posttest assessments. Program participants had been preparing and selling foods for an average of 6 years (SD=7.9; Range: 0-35 years). Participants had a wide range of employees (0-200; M=54.6; SD=60.7). Pre- and post-assessments were matched for the analysis. Wilcoxon signed rank was used. Alpha was set at 0.001 to adjust for familywise error rate with 54 tests. Statistically significant changes were observed from pretest (Mdn=3.0) to posttest (Mdn=4.0) on perception of sufficient food safety implementation ($z=-3.606$; $p<0.001$; $r=0.64$); from pretest (Mdn=3.0) to posttest (Mdn=4.0) on perception of control over scheduling how often the facility's waste system was monitored ($z=-3.419$; $p=0.001$; $r=0.60$); and pretest (Mdn=3.0) to posttest (Mdn=4.0) on perception of knowledge about appropriate food storage temperature ($z=-3.419$; $p=0.001$; $r=0.60$). Prochaska and DiClemente's Stages of Change Model determined program participants' intention to sell foods produced in their facility. There was no significant change from pre to post.

Title: **FSMA Education and GAP Training Targeting Small and Limited Resource Specialty Crop Growers**

Author(s): **Duncan M. Chembezi**, Alabama A&M University
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The goal of this project is to increase produce sales and overall profitability of specialty crop growers through GAP training, FSMA education and awareness, ongoing support, and technical assistance. The project was conceived to educate and train limited resource growers on FSMA legislation and GAP Preventive Controls for Human Food Rule to increase customer and consumer awareness of produce safety protocols and education. Small-farm agriculture remains a vital part of agricultural economies of most southern states. Demand for locally grown fresh produce in Alabama, Georgia, and Tennessee continues to grow due to increased dietary and health concerns, loss of family farms, and general transition from cotton and broiler production to specialty. However, the lack of viable markets and marketing channels continues to daunt the industry. The project targets growers in eleven counties and communities underserved by government programs, and in need of outreach education and technical assistance.

AAMU Small Farm Research Center in collaboration with its partners has hosted eleven FSMA Produce Safety Alliance (PSA) Growers Trainings, one Integrated FSMA's PSA Training for growers and trainers jointly, and six Produce Safety Farm Field Days. The project has provided training and education to 189 farmers, extension agents, and food safety specialists. Farm field days centered around PSA modules on food safety compliance regulations. Pre- and post-test surveys reveal that growers have benefited enormously from the produce safety programing. They have become more knowledgeable about agricultural water and related regulations, and the role of food safety issues in relation to consumers. Participating growers acknowledge they have a better understanding of the role of the Alabama Department of Agriculture and Industries with respect to food safety; significance of produce safety education; and are more comfortable and confident with produce safety issues. Project outcomes will support local food systems in Alabama, Georgia, and Tennessee, and increase access to nutritious, safe, fresh produce in economically challenged and underserved communities while improving food safety and regulatory compliance. Growers appreciate one-one-consultations and mentoring sessions, and more so, experiential learning activities such as farm tours, field days and hands-on demonstrations. This work is supported by USDA-NIFA-FSOP Grant #2017-70020-27253.

Title: **Food Safety Solutions for Farm Owners and Employees**

Author(s): **Margaret Christie**, Community Involved in Sustaining Agriculture (CISA)
Kristen Wilmer, Community Involved in Sustaining Agriculture (CISA)

Background and project importance: CISA provides farms in our region of western Massachusetts with targeted, individualized support in meeting FSMA guidelines, working in close partnership with University of Massachusetts Extension and the Massachusetts Department of Agricultural Resources Produce Safety Team. We focus on small farms that sell at least 50% of their products direct to consumers; farms and aggregators doing light processing or producing value-added products; and farms that must comply with Produce Safety Rule standards and require sustained, individualized support to enable them to initiate or complete the process. In addition, we help farms provide food safety support and training for farm employees, especially those with low English or literacy skills.

Objective or Purpose: Provide customized support to farms and aggregators in meeting food safety standards and accessing related training and resources.

Methods: CISA and our partners provided responsive, customized support to farms and aggregators. Services provided included the following:

- Online and one-on-one support for farms managing food and worker safety during the early stages of the Covid-19 pandemic.
- Creation of videos and written materials for use in training employees in food safety protocols, including two Maay Maay-language videos and a video available in English and Spanish for use in worker training on diverse produce farms.
- Development of practical food safety plans.
- Grant planning and writing support for state grants that fund on-farm food safety improvements and upgrades.
- Information and referral.

Results: The period of this grant coincided with the Covid-19 pandemic. The pandemic led to an increase in demand for assistance related to food and worker safety which we were able to help fill, along with other Massachusetts service providers. The pandemic also resulted in additional grant funding for farmers, with many applicants including food-safety-related infrastructure upgrades in their proposals. We helped farmers successfully apply for these grants by offering project planning and grant review support. Farmers access assistance through multiple channels, and benefit from accurate, customized, and responsive support through a coordinated network of service providers.

Significance or key outcomes: Worker training on food safety procedures and rationale emerged as an important area in which farmers need additional support in our region.

Title: **Bridging the Gap: Expanding a HACCP-based Curriculum to Help Produce Growers Treat Agricultural Water**

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Pre-harvest water treatment is allowed by the Produce Safety Rule and has recently been required by some buyers or marketing agreements for specific commodities, such as leafy greens. A previous FSOP collaboration with our team led to the creation of a one-day curriculum consisting of four modules with hands-on activities, and other training aids such as four animated videos and an interactive test strip lab iPad app to reinforce key concepts (available at irrigation.nmsu.edu). After piloting the curriculum with key stakeholders, we were able to deliver the curriculum through new FSOP funding which began in 2020. There have been four train-the-trainers which have been held in 2020-2022, educating 143 trainees from 39 different states and territories. Participants in the train-the-trainer course increased their knowledge by 21.4% based upon results of a pre/post-test. When asked how they would utilize the training, 77.9% of the TTT participants indicated they would use it to support growers and allied industries through one-on-one interactions, and 59.3% said they planned on using content for training. An additional 193 growers participated in growers-training held both in person as well as remotely. Amongst the grower training participants, knowledge of approaches for treating agricultural water increased by 25.8%, with a significant increase in knowledge connected to training. In course participant surveys (both TTT and grower trainings) 92-100% of participants were satisfied with the course content and delivery from the training team. Fifty-seven percent of participants rated the training as excellent, with the remaining 43% rating the training as good or very good (mean rating of 4.53 on a 5-point Likert scale). The team plans to continue work to deliver TTT course in order to expand delivery across the United States, as well continued delivery of grower trainings within our states.

This work was supported by Food Safety Outreach Program grant no. 2016-70020-25803 and 2020-70020-33024 from the USDA National Institute of Food and Agriculture.

Title: **Increasing Accessibility of Food Safety Education to Beginning and Underserved Farmers through Remote Learning Resources**

Author(s): **Michelle Danyluk**, University of Florida
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Fresh produce does not receive a "kill step" prior to consumption, therefore farms must implement food safety practices to reduce the risk of contamination during growing, harvesting, packing, and holding activities. Food safety training programs are designed to educate farm workers on implementation of practices that reduce the risk of food-borne illnesses. Typical training programs are in-person and instructor-led, which cost the grower both time and money to attend. These barriers often prohibit beginning and disadvantaged growers from attending these training events. To address this inequity, the University of Florida in collaboration with Florida Agricultural and Mechanical University, is developing digestible remote learning produce food safety videos that are accessible to small, beginning, and minority growers. These videos will be free of charge and accessible to growers throughout the United States. The intended result of the videos and resources produced is to increase awareness of food safety risks and identify practices to implement on the farm.

Title: **Food Safety Outreach in Rhode Island**

Author(s): **Margaret DeVos**, Southside Community Land trust
Chandelle Wilson, Southside Community Land trust

Over the past decade, agencies all over the country have responded to the *Food Safety Modernization Act (FSMA)* with the production of educational resources, and model systems to help businesses address the very real and important concern of securing the integrity and safety of our food system. Most have not been designed to accommodate socially disadvantaged farmers in RI who continue to struggle grow their marketing beyond direct-to-consumer distribution systems. For these farmers, access to wholesale markets are blocked by lack of GAP certification.

Our goal is to level the playing field in Rhode Island to create access to capital, education and social connections in the food system among young and socially disadvantaged farmers with language, literacy, and cultural barriers.

SCLTs project:

1) Partners with local organizations that focus on food safety education, as well as our local cooperative extension to connect growers to the Good Agricultural Practices (GAP) and Serve Safe courses needed to begin the development of comprehensive FSMA compliance strategies.
2) Engages local community interpreters to support farmers in these courses and limit language barriers.
3) Provides one on one technical assistance to farmers to have their farm GAP certified and provides ongoing technical assistance to maintain compliance.
4) Assists farmers to register as produce farms per new FSMA related regulations in the State of RI.
5) Advises other farm service providers and food safety trainers in ways they can deliver services and training that are more accessible for disadvantaged farmers.

Title: **Hybrid Training for Quality Assurance and Food Safety Programs Designed for Small-Scale Food Processors and Distributors**

Author(s): **Erin DiCaprio**, University of California at Davis
Thais Ramos, University of California at Davis
Betty Feng, Purdue University
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Gabriel Davidov-Pardo, California Polytechnic State University at Ponoma

Developing and implementing required Food Safety Plans can be challenging, especially for small-scale processors. The goal of this project is to develop a hybrid training curriculum to address food safety and regulatory knowledge gaps while meeting the need for flexible and low-cost training for small-scale food processors. To gain deeper insight into food safety training needs, the project team conducted interviews with food safety managers from small-scale food processing facilities to better understand current practices around food safety training and training challenges within their organization. The questionnaire developed was validated through review by multiple industry and Extension professionals, then pilot tested with an experienced food safety manager. While approximately half of interviewees indicated a preference for in-person training for their organization, many felt that low-cost online food safety training would be of value. Interview participants also identified lack of time as a major barrier of food safety training, which could be alleviated by online training options. Participants suggested using in-facility pictures and “real world” examples in the online food safety training. The data gathered helped to inform the development of the online course. The online course material developed includes 50 short presentations and supplementary handouts in topics areas including food safety regulations, good manufacturing practices, quality assurance and quality control, food microbiology, and general food safety. All the learning modules were subjected to peer review in 2021/2022. The online course materials are currently undergoing graphic design and translation into Spanish. The anticipated pilot launch is fall 2022. The online course will be supplemented with in-person workshops which will occur in 2023.

Title: **Growing the Culture, Collaboration, and Capacity of Farmer-to-Farmer Food Safety Trainers**

Author(s): **Cristina Dominguez**, La Semilla Food Center
Mario Holguin, La Semilla Food Center

La Semilla Food Center is a community-based organization (CBO) and food hub that serves the needs of non-traditional, niche, and hard-to-reach grower audiences in the Paso del Norte region. Through this project, La Semilla is meaningfully partnering with like-minded community-based organizations to implement a Collaborative Education and Training Project that advances both the priorities of the Food Safety Outreach Program and the missions of the project partners who share common food safety concerns, represent a diverse array of non-governmental organizations, CBOs, food hubs, and farm cooperatives, are interwoven within their respective local communities, and whose contributions to the project will collectively increase food safety outreach to socially-disadvantaged farmers. This project supports the development and delivery of food safety trainings that will have a multi-county, state-wide, and multi-state impact, in addition to including significant collaboration among project partners, through a network of bilingual (English and Spanish language) Food Safety Ambassadors, train-the-trainer workshops, bilingual videos, Tier 1 and 2 food safety trainings, and on-farm risk assessments in New Mexico and El Paso, Texas. Previously, La Semilla was an active partner in another CBO's FSOP Community Outreach Project where we assisted in the development of curriculum, Spanish translation, and delivery of that project's food safety trainings serving states in the Four Corners region. This project builds upon this existing approach and curriculum, incorporating La Semilla's human-centered design to refine the trainings and reach new non-traditional, hard-to-reach audiences. In this way, the trainings are led by known community members who both reflect and understand the needs of our target audiences.

Title: **Enhancing Food Safety Capacity of Western Elderberry Producers: Best Practices for Harvest and Processing**

Authors: Erin DiCaprio, University of California at Davis
Thais Ramos, University of California at Davis
Gwenael Engelskirchen, University of California
Gail Feenstra, University of California

Blue elderberry (*Sambucus nigra* spp. *cerulea*) is a native crop in California and other western states in the US. In California, blue elderberry is now being utilized in hedgerows as a sustainable agricultural practice, with potential value-added from harvesting berries and flowers. Both elder fruits and flowers can be used to process a wide range of food products. The goal of this project is to increase the understanding and adoption of food safety practices across the supply chain, from harvest to processing (e.g., drying, freezing, jam production, etc.) for this non-traditional crop. Four site visits (spring/summer 2021) to small-scale farms growing elderberry plants were conducted to inform the project team of current harvesting and processing practices. The team developed a 43-question survey targeting elderberry growers and processors to further understand the current practices and food safety knowledge related to elder fruit and flower harvesting and value-added processing. A total of 61 individuals completed the survey, 45 respondents indicated processing either elder fruit and flowers. Of those processing, 46.7% were making a formulated product (i.e., jams, syrups, teas), 33% dried berries or flowers, and 15% froze berries. Most respondents (70.6%) expressed interest in learning about best practices for harvesting and handling, while others (64.7%) indicated that they are interested in learning about post-harvest processing such as freezing and drying. The project team plans to deliver two educational webinars in May-June 2022 focusing on elderberry food safety practices. Four guides on best practices related to harvesting, post-harvest handling, on-farm drying, and freezing of elderberry fruit and flowers will be completed by June 2022.

Title: **Expanding Food Safety Resources for Local Food Producers in California**

Author(s): **Kali Feiereisel**, Community Alliance with Family Farmers

According to 2012 agricultural census data, 22,472 farms in California need to be in compliance with the Food Safety Modernization Act's (FSMA) Produce Safety Rule (PSR). Of those, 75 percent are small and medium scale. Community Alliance with Family Farmers (CAFF) is a non-profit organization that has been working with family farmers throughout California for over 40 years. Since 2006, we have provided over 135 food safety trainings to over 3,000 farmers, 9 webinars to over 375 farmers, 1-on-1 technical food safety support to over 200 farmers during which we have answered almost 600 questions, 10 podcast episodes on food safety, and helped over 250 complete farm food safety plans. This project seeks to expand our food safety program to small/medium, organic, beginning, and socially disadvantaged farmers by updating resources so that they are aligned with FSMA, providing a cost-share program to help offset the financial burden of water tests, offer outreach and education on any updates or changes to water requirements of FSMA PSR, and a series of case studies where farmers that have completed FSMA Inspections share their lessons learned. At this stage in the project, we have been able to award water and/or 3rd party audit cost-share funds to 15 farmers for water tests and three farmers for third party audits. Later this spring, we will post a blog post summarizing the proposed water rule and suggestions for what farmers should do while we wait for the final rule. We have the first interview with a farmer for a case study scheduled and look forward to completing the rest of the case studies this spring/early summer. We have completed updating our food safety plan template and recordkeeping templates to be aligned with how the law currently stands.

Title: **Engaging with Military Veteran Farmers with Food Safety Education Before and During COVID Pandemic**

Author(s): **Yaohua Feng**, Purdue University

Introduction: With the increasing food safety regulations, small-scale farmers are facing more challenges to make profits from producing agriculture commodities. Veteran farmers who are commonly farming small-scale are rarely targeted by previous food safety programs to evaluate the effectiveness of food safety educational interventions. During COVID pandemic, constant changes and uncertainties made food safety education even more challenging for this group.

Purpose: Develop virtual and hybrid programs to engage veteran farmers with food safety education and communication.

Methods: Before the COVID pandemic: Three educational interventions were pilot-tested among Indiana military veteran farmers, including learning circles, in-person workshops, and electronic newsletters. Thirty-four veteran farmers participated in the evaluation of these interventions, including 16 in-person workshop participants, 9 learning circle participants, and 9 electronic newsletter participants.

During the COVID pandemic: Three delivery formats were explored to engage military veteran farmers, including virtual hands-on module, webinar sessions, and hybrid (in-person and recorded) sessions. Over 400 military veteran farmers were reached.

Results: In-person sessions reached less target audiences but tended to have a greater change in knowledge, attitudes, and behaviors. Electronic newsletters are preferred delivery format. However, the effectiveness was not as promising. Virtual hands-on modules can serve as an alternative of in-person workshop, with higher initial cost for development and larger reach of audiences.

Significance: The findings shed light on the veteran farmers' barriers to food safety practices and education programs. It will guide extension educators and policymakers to develop audience-targeted food safety programs for veteran and other socially disadvantaged farmers.

Title: **Food Safety Needs Assessment of Produce Drying: From Human Factor Perspectives**

Author(s): **Yaohua Feng**, Purdue University
Erin DiCaprio, University of California, Davis
Amanda Kinchla, University of Massachusetts, Amherst
Nicole Richard, University of Rhode Island

Background: Rising foodborne outbreaks implicating low-moisture foods urge the food safety evaluation of produce drying. However, there have been limited food safety needs assessment available. The lack of information challenges audience-targeted food safety outreach for the stakeholders.

Purpose:
(1) identify the knowledge gaps and food handling practices of produce drying, using apple as a case study;
(2) identify food safety concerns in small-scale produce drying from the food safety inspectors' perspective.

Methods: Study 1: A cohort of home apple dryers (N=979) participated in an online survey through Qualtrics XM. The 69-question survey was refined based on food safety experts' written feedback and guided verbal tests with laboratory members.

Study 2: A systematic search of dried apple recipes from YouTube videos (97), blog articles (112), cookbooks (20) and extension publications (22) were conducted.
Study 3: Food safety inspectors were recruited from multiple states. The interview script was reviewed, and pilot tested. Interviews were conducted via Zoom.

Results: Produce dryers lack food safety knowledge and recipes lack food safety information. The survey results revealed inadequate frequency of handwashing during apple preparation (52%), potential points of cross-contamination from kitchen tools (31%), and failure to incorporate a thermal kill step during drying (average temperature 130°F). Drying temperatures were missing in many recipes (cookbooks 35%; videos 41%). Almost no recipes provided temperature or humidity levels for safe storage.

Produce drying inspection has confusions in regulation interpretation, and inspectors want more technical support from university extensions. Stricter regulations were used for produce that are processed including peeling, grinding and slicing. Inspectors did not have specific levels for drying parameters they would evaluate as food safety controls. All of them mentioned looking for "very basic" items.

Significance: Findings reveal the need for drastic improvement of food safety information dissemination, regulation interpretations, to processors, educators, and inspectors.

Title: **Small and Medium Processor Costs of Preventive Controls Compliance**

Author(s): **Jill Fitzsimmons,** University of Massachusetts Amherst
Amanda Kinchla, University of Massachusetts Amherst
Christina Wormald, University of Massachusetts Amherst

Small and medium processors (SMPs) face many barriers to implementing food safety plans that account for Preventive Controls. Among these barriers is a lack of knowledge about the costs associated with developing, implementing, and monitoring a robust food safety plan. To begin to build a framework for understanding these costs, we interviewed 10 small and medium processors. We present that framework and corresponding cost estimates.

Small and Medium Processors are right to consider the costs of food safety as among the important costs of doing business. In our study, we find that in the first year, SMPs should expect to spend about $21,932 to Plan, Implement, and Monitor their food safety plans (FSP), and they should expect to spend almost $8,000 in every subsequent year to Monitor and enforce the FSP. These costs, of course, vary according to the business itself, including what stage of life the business is at, the hazards involved in the product manufactured, how much product is manufactured, what kind of facility is used, etc. But the costs, particularly for a small or beginning food business, are sizeable. SMPs that appropriately plan for this important business cost will be better prepared to develop and fulfill a robust FSP.

Title: **Activities for Interactive Tools to Improve the Practice of Food Safety iTIPS**

Author(s): **Nancy C. Flores**, New Mexico State University
Barbara Chamberlin, New Mexico State University
Shannon Coleman, Iowa State University
Amanda Kinchla, University of Massachusetts at Amherst

The “interactive Tools to Improve the Practice of Food Safety” (iTIPS) project is a multi-state approach to improve food safety culture to reduce risk in small food processing establishments. Most small food businesses have inadequate resources, low English proficiency, and limited time to adapt to the Food Safety Modernization Act requirements. This project’s overall goal is to deliver a training program that aims to provide easy and accessible novel interactive digital education tools, food risk management training for small food manufacturing operations, and sustain local food businesses that will meet the requirements for Food Safety Modernization Act (FSMA).

The iTIPS project team has a strong collaborative partnership with non-governmental organizations and community-based organizations to serve on the advisory committee. A survey of this stakeholder group will lead to the development of interactive tools by the iTIPS project team.

The impact of this project expands within the iTIPS states and U.S. regional centers: the Western Regional Center to Enhance Food Safety (WRCEFS), the Northeast Center to Advance Food Safety (NECAFS), and the North Central Region Center for FSMA Training, Extension, and Technical Assistance (NCR FSMA). This team is led by New Mexico State University (NMSU), which has established collaboration with community partners and successfully designed interactive digital bilingual educational needs for food producers and processors. This project will provide bilingual food safety resources and technical support for food manufacturers to develop a food safety culture and improve food safety practices within their facilities to fully implement FSMA food safety concepts.

Title: **Online Food Safety Training for New Mexico Food Manufacturers**

Author(s): **Nancy C. Flores**, New Mexico State University
Sharon Bartley, New Mexico State University
Paul Gutierrez, New Mexico State University

The goal of this work was to develop training modules for manufactured food facilities in New Mexico. This was accomplished by modified existing materials using the Popular Education model for Hispanic and Native American audiences and for local food processing systems. The project team (Rebecca Mijares, Karla Y. Lopez, Adetoye Abodunrin, Gabriela Reyes, Ricardo Ogaz, Martha Minor and Judah Sanchez), consisting of New Mexico State University (NMSU) faculty, staff, and students, worked together to manage and complete the tasks to meet the project goals. The database of producers and processors have been compiled for audience to use in pilot tests. Developed materials were piloted for the target audience in focus groups for appropriateness for target audience and then tested for online delivery that will certify farmer-processor and food manufacturer. Developed training materials, videos, information were also reviewed by WRCEFS partners and were presented as a Train the trainer workshop. From workshop feedback, the modules were modified to be more user friendly and have more interactive features for online asynchronous training. We are still in the process of doing the final modifications as needed before implementing live online certification program. The revised modules will be re-launched in May 2022.

For the training materials, learning objectives and activities are tied to specific levels of understanding. This curriculum incorporates three levels of understanding including knowledge (level one), comprehension (level two), and application (level three). By using our module on hair restraints as an example, understanding at level one would be for participants to list the different types of hair restraints available to food workers. An example of level two understanding includes participants being able to describe how to properly wear the different types of hair restraints available to food workers, explain why food workers must wear hair restraints to ensure food safety as well as personal safety, and identify how to properly use hair restraints. To achieve the third level of understanding, students should be able to demonstrate how to properly use hair restraints.

Title: **Innovative and Supplementary Food Safety Training, Education, and Outreach Program for Small and Medium-Sized Food Producers and Processors**

Author(s): **Girish Ganjyal**, Washington State University
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Any person who works with food must be adequately trained to be able to recognize the hazards related to food production and processing and to implement the control methods to mitigate those hazards. The Food Safety Modernization Act (FSMA) presented the industry with new and more stringent requirements. These requirements vary across the industry and on the type and size of the firm, annual sale value, type of the specialty crop or food product, and how produced crop/product is further utilized. The complexity of the new regulations is overwhelming for producers, especially small to mid-sized farms, beginning and socially disadvantaged farmers, and small processors, who often struggle to determine which regulations apply to their operation and how to meet all the requirements. These stakeholders are still looking for assistance in making this significant transition to the new regulations and standards of food safety.

Thus, this project aims to develop and deliver science-based food safety educational outreach programs leveraging our current networks within the state to provide the local small and mid-sized food producers and processors with relevant tools and resources. A variety of training programs will be developed to cover key topics related to food safety and augment the standardized curriculum. The trainings will be offered in-person at different locations across the Washington state as well as online to facilitate the participation of stakeholders in remote locations. This will facilitate their ability to make knowledgeable and cost-effective management decisions pertaining to the production of safe and healthy produce and value-added products.

Due to the pandemic, we had to pivot to online synchronous training delivery. We hosted ten online trainings: nine – PCHF Part 2 trainings and one – Introduction to Third Party Food Safety Audits. With our online trainings, we have reached stakeholders who live in remote locations. We hope to pivot back to in-person training soon. We are in the development stage for the curriculum of our online asynchronous trainings including (i) Basics of Sanitation; (ii) Basics of Sanitation – Spanish; (iii) Food Microbiology; (iv) Food Microbiology – Spanish; and (v) Food Safety for Small Scale Seafood Processors.

Title: **Food Safety Outreach and Technical Assistance to Limited Resource, Socially Disadvantaged Farmers in Santa Clara, San Benito, Santa Cruz Counties**

Author(s): **Aparna Gazula**, University of California
Qi Zhou, University of California

Understanding and implementing Food Safety Modernization Act (FSMA) and food safety Good Agricultural Practices (GAPs) on-farm is very challenging for socially disadvantaged farmers (SDFs) who have significant language barriers, minimal educational background, financial hardships, lack time commitment, and access to technical resources. The goal of this project is to equip SDFs with the knowledge and educational resources needed to successfully implement food safety GAPs and FSMA compliance requirements on their farms. The specific objectives of this project are: 1) Provide customized technical assistance to SDFs to comply with GAPs and FSMA requirements through food safety workshops, Produce Safety Alliance (PSA) grower trainings, on-farm mock inspections, one-on-one technical assistance, and tailgate meetings; 2) Develop culturally relevant food safety educational materials and FSMA required labeling and recordkeeping templates (in different languages) to SDFs. Outcomes and outputs to date include: 1) We conducted a food safety workshop on September 5th, 2019 to introduce FSMA and Produce Safety Rule to SDFs (20 attendees); 2) For SDFs that were unable to attend the September 5th workshop, we held “one-on-one meetings” on September 11th, September 18th and October 2nd (48 attendees); 3) We provided a Chinese language PSA Grower Training on August 25th-26th, 2021 (69 attendees); 4) We conducted on-farm assessments of 77 farms and provided Chinese and Spanish language FSMA recordkeeping binders, signage, and first-aid kits; 5) We provided assistance to 57 SDFs with California Department of Food and Agriculture required self-reporting FSMA survey form; and 6) We developed/translated the following materials into Mandarin: PSA Growers Training PowerPoints, pre-/post-tests, over 30 FSMA required recordkeeping templates, signs, checklists, GAPs templates, and educational factsheets. Evaluations showed that the workshops, meetings (100%), PSA Grower Training (94%) and on-farm assessments increased growers’ food safety knowledge and 81% of SDFs plan to seek food safety technical assistance from the University of California Cooperative Extension Small Farm Program in the future.

Title: **Development and Implementation of Innovative Food Safety Training Tools for the Production and Distribution of Microgreens**

Author(s): **Kristen E. Gibson**, University of Arkansas System Division of Agriculture
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Sujata Sirsat, University of Houston

Background: Microgreens are an emerging salad crop for which minimal information regarding food safety, industry best practices, regulatory nuances, and safe handling by consumers is available.

Objectives: Our long-term goal is to decrease potential food safety risks related to the production and distribution of microgreens. The objectives are to 1) characterize production and distribution aspects of the microgreens industry; 2) develop novel food safety training curriculum, best practice messaging for consumers, and guidance documents for buyers and regulators of microgreens; and 3) deliver materials to stakeholders across the microgreens supply chain.

Methods: For consumer outreach, a nationwide survey was conducted. To determine accuracy and quality of existing microgreen training materials available on the internet, a content analysis was completed. Semi-structured interviews and on-farm environmental assessments will be conducted to further characterize production and distribution practices of microgreens growers. Training materials and guidance documents will be developed.

Results: Microgreens consumer survey (N=660) identified key practice messages related to safe handling of microgreens. To deliver messages, a social media communications plan and website have been established. The content analysis revealed most artifacts (N=223) minimally covered the food safety principles in the FDA FSMA PSR related to growing microgreens. A list of microgreens growers for in-depth interviews has been compiled, and the on-farm environmental assessment tool is being developed.

Key Outcomes: We identified that microgreens consumers may not understand how to handle microgreens after purchase, and there is confusion about the difference between microgreens and sprouts. We have developed a consumer outreach campaign to convey evidence-based practices for handling microgreens. The content analysis further justifies the need for scientifically valid food safety training and education materials for microgreens growers.

Title: **Environmental Assessments to Customize Food Safety Training for Very Small to Small Strawberry Producers in the Southeastern United States**

Author(s): **Kristen E. Gibson**, University of Arkansas System Division of Agriculture
Angela M. Fraser, Clemson University

Background: Strawberries are rated the fifth most preferred fresh fruit in the U.S. Additionally, in the southeastern U.S. (SEUS), very small strawberry-growing operations are particularly common presenting unique challenges to the implementation of risk management practices (RMP).

Objective: Our long-term goal is to reduce the burden of foodborne disease attributed to on-farm contamination of fresh berries. An intermediate step towards this goal is the development of a novel 'add-on' curriculum. The objectives are to: 1) conduct surveys and interviews with very small to small-sized strawberry growers in the SEUS.; 2) conduct environmental assessments on very small to small-sized strawberry farms in the SEUS; and 3) develop and evaluate the add-on curriculum delivered to very small to small-sized strawberry growers.

Methods: A mixed methods approach was used to characterize the target population and inform context-specific training curriculum. First, a 45-item survey was developed to collect data regarding each strawberry grower's location, farm characteristics, and RMP. Next, semi-structured interviews and on-farm environmental assessments were conducted to further explore factors impacting implementation RMP related to FSMA Produce Safety Rule. Following identification of training needs, a context-specific training and associated evaluation tool was developed and pilot-tested.

Results: Growers (n=90) responding to the survey indicated a high frequency for the use of RMP but not the documentation of RMP. On-farm environmental assessments (n=20) allowed for calculation of physical attribute (PA) scores which were highest (90%) for animal control and lowest (55%) for food safety signage. In addition, grower interviews (n=9) indicated a need for training on the documentation and record keeping of RMP. Based on these findings, training was developed to address proper use of sanitizers; a deeper explanation of documentation, record keeping, and monitoring; and development of standard operating procedures (SOPs).

Key Outcomes: Training curriculum was remotely delivered to 20 participants over a 3-hour period. A significant difference in the pre- and post-test scores of participants was not detected; however, we did observe several positive increases in the perception of growers towards Action Planning, Perceived Behavioral Control, Attitude, Environmental Context and Resources, and Intentions.

Title: **Rules to Reality: Practical Application of Produce Food Safety for Small to Midsize Virginia Farms**

Authors: **Stasia Greenewalt**, Local Food Hub
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Sarah Sharpe, Virginia Cooperative Extension

While many small and midsize farms in Virginia are not fully covered by the Produce Safety Rule (PSR), heightened marketplace awareness of food safety concerns has increased market requirements for greater assurance of the safety of produce. In 2019, only half of surveyed farms were confident in knowing their FSMA PSR status. The aspects of the PSR that were most challenging to growers included recordkeeping, understanding how their PSR status affects their farm, and wildlife monitoring.

The goal for this project was to increase competitiveness and opportunity for small to midsize growers in the wholesale marketplace and ensure that growers increase knowledge of food safety and compliance with FSMA's Produce Safety Rule.

The partners created an online, self-paced Canvas class, Rules to Reality, for growers, with modules including *Review of the Produce Safety Rule*, *Worker Training, Animal Risk Management, Cleaning and Sanitizing, Post-Harvest Handling, Required Records*, and additionally, modules on *Qualified Exemption*s and *On-Farm Readiness Reviews and PSR Inspections*. Each module contains a narrated PowerPoint presentation, abundant resources, a pre and post assessment, and a video of Virginia farmers explaining how they implement on-farm food safety. The class was successfully piloted in January 2022 with positive results, and is currently in the peer review process to become PSA add-on curricula. In all, 81.25% (13/16) participants increased their knowledge based on pre and post test scores with an average test score increase of 14.9 points. The Worker Training and Post-Harvest Handling modules had the greatest knowledge increase gains by participants.

Additionally, to help farmers with the challenge of required recordkeeping, a preliminary version of an on-farm food safety recordkeeping tool was created that will allow farmers to select a program (GAP, PSR), set up forms for their farm, get reminders, and approve submitted forms.

Title: **Expanding Food Safety Outreach to Iowa Beginning Farmers Through the Clean Start Program & Professional Development of Value Chain Coordinators**

Author(s): **Jason Grimm**, Iowa Valley RC&D
Claire Zabel, Iowa Valley RC&D

In 2020, FSMA compliance applied to very small producers (with between $25,000 and $250,000 in annual revenue) which required additional knowledge and time for beginning farmers with an already stressful schedule. Even after adequate food safety training, the costs of implementing corrective measures may be prohibitive for those small producers and prevent them from expanding within the local economy. Iowa Valley RC&D proposed to improve food safety in Iowa by providing specialized on-farm food safety consultation to 12 small, beginning produce farmers, providing a $2000 stipend to each farm for food safety improvements, and expanding the network of certified food safety professionals in the state. Project Staff worked collaboratively with the North Central Region Center for FSMA Training, Expertise, and Technical Assistance. Project staff developed the *Clean Start Food Safety Coaching Program* to help small, beginning farmers comply with FSMA guidelines and connect them with regional and state networks of producers and food safety professionals. Educational materials containing locally relevant information were produced by IVRC&D and used in the Clean Start program and distributed to partner organizations and through social media. Beginning small farmers were also trained in digital recordkeeping practices to save time and enable end-of-season analysis. Concurrently with the production of these educational materials and the Clean Start program, IVRC&D sent two staff members to Produce Safety Alliance Trainer training and USDA GAP Auditor training in order to increase the number of qualified food safety professionals and continue the expansion of food safety outreach in Iowa.

Title: **Training and Technical Support to Help Small Vegetable Farms Meet the Cleaning and Sanitization Requirements of the Produce Safety Rule**

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Insufficient or inadequate cleaning schedules, insufficient documentation of implementation, and lack of Standard Operating Procedures used for cleaning and sanitizing of equipment are significant barriers to small farms achieving compliance with the Produce Safety Rule. This project addresses those barriers with a suite of educational resources, scale-appropriate trainings, and technical assistance.

The goal of this project is to help small, diversified farms identify their specific needs related to produce safety and to develop plans to address those needs, leading to the adoption of improved cleaning and sanitizing practices. In year one of the project, 10 partner farms in GA, MI, NH, NY, and VT led farmer-to-farmer remote workshops that identified information gaps and challenges as well as innovative solutions related to produce safety. That process led to the development of 6 webinars conducted by farmers and service providers focused on high-priority topics: managing bins, doing more with less, wash-pack floors, wash water management, employee management, and bubblers for washing leafy greens. Ninety-six people registered for the workshops including 80 small and medium-scale farmers growing 408 acres of vegetables in GA, MA, ME, MI, NH, NC, OH, NY, VT, and Ontario.

The project developed a website that holds a curated set of guides, templates, webinar recordings and videos that provide practical information on the adoption of produce safety practices by small farms. These SCRUB outputs and event recordings are housed on a dedicated sub-page of the UVM Extension Ag Engineering blog at http://go.uvm.edu/scrub. These resources have enjoyed 4,412 page views by 2,158 unique visitors over the past 18 months.

The SCRUB team has reached 156 farmers among 55 farms as a result of 168 individual contacts (e.g., workshop, 1:1 meeting, phone call, email) and 248 contact hours. This work has resulted in 135 outcomes including 5 new produce safety plans, 11 farms improving postharvest ag water practice, 59 farms improving hygienic design for cleaning and sanitizing, 22 farms creating or improving SOPs, 12 farms improving employee training, and 26 farms improving produce safety culture.

Participating growers shared:
"We know this is important and we have been wanting to do this for a while."

"Now that I have a template, I can work on it - starting from scratch was too much."

"We have never prioritized wash/pack, and SCRUB gave us the kick in the behind we needed."

Title: **Building a Food Safety Training Program to Empower Disadvantaged Producers in Alabama**

Author(s): **Janice Hall**, Auburn University
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Anthony Pinkston, Communities Improvement Association, Inc

The Building a Food Safety Training Program to Empower Disadvantaged Producers in Alabama is designed to help limited-resource minority growers in Alabama meet challenges faced by local farmers. The outreach will aim to provide food safety training and opportunities to underserved communities throughout the Black Belt region of the state. The target counties are noted for their especially low economic status. Most of the target audience will be small farmers with small inherited acreage whose desire is to hold onto their land and pass it down to future generations. These farmers have access to the fertile black belt soil but lack access and knowledge of getting the full benefit of its usage and food safety. This outreach will provide training and resources to assist in those efforts. There will be a variety of food safety programming offered to assist in empowering farmers with the food safety knowledge they will need to sell their produce and products in competitive market venues. To accommodate all socially disadvantaged farmers, additionally, this project will adapt curricula and delivery methods to meet the needs of low vision, low hearing, and low literacy audiences. This will include providing large print curricula materials, magnifying tools, PA systems, and large screens positioned for optimal viewing. These accommodations will also be available virtually for those unable to attend face to face. Participants will learn how to safely handle produce from field to processing. Food safety training subjects will involve, but not be limited to, water quality and use, land use, worker health and hygiene, manure and compost, wildlife management, rotational grazing, sanitation and post-harvesting, home-business startup in Alabama, processing jams and jellies, and serving safe food from purchase to consumption. The goals and outcomes will be evaluated using a combination of program efficacy, effectiveness, and impact. At the end of the project year, a Farm Resource Day will be held to allow growers and processors the opportunity to educate consumers on what they have learned and to sell produce they have grown.

Title: **Bi-Lingual and Bi-Cultural Food Safety Training for Hmong American Farmers Across the Country**

Author(s): **Janssen Hang,** Hmong American Farmers Association

There are over 299,000 Hmong American living in the United States (US) and many of them farm. In fact, many metropolitan areas where Hmong people concentrate, also have vibrant farmers markets, but the problem is that Hmong famers are working hard, and barely making it.

The goals of this proposed project are to build the capacity of Hmong farmers around food safety so that they can comply with Food Safety Modernization Act (FSMA) and the Produce Safety Rules (PSR), stay in farming and ultimately, leave behind a strong legacy for their family members and community. We hope to accomplish this by Introducing Hmong farmers from multiple states and region to FSMA and its significance; Train Hmong famers on the rules and regulations outlines in the new law; Decrease any misunderstandings, fears or anxiety associated with FSMA compliance; Improve relationships between Hmong farmers and FSMA governing or inspections entities in the respective states; Building a national pipeline of bi-lingual and bi-cultural Hmong FSMA trainers; Support the creation of local community based organizations or cooperative led by Hmong farmers; and Support the creation of a robust national network of organizations that work with Hmong farmers.

In order to accomplish these goals, the Hmong American Farmers Association (HAFA) and our partners organization across the United States adapt and enhance existing food safety curricula for Hmong farmers; conduct bi-lingual and bi-cultural food safety training workshops for hundreds of Hmong farmers in the respected state and increase the pool of Hmong speaking food safety trainers by recruiting and supporting Hmong bi-lingual and bi-cultural agricultural staff across the country.

But pandemic disrupted the approach and, in our assessment, Hmong farmers did not have access to technology; access to email and zoom; thus elevating the issue of equity. To remedy these challenges, a technology bank was created to signed out computer to farmers; create individual email account and established a training tutorial to navigate window, email and zoom that allow our training to be successful.

In all, 8 trainings were conducted with a total of 96 participants that engaged in a multi-day virtual training. To increase access during the pandemic, Produce Safety Alliance (PSA) piloted an “alternative language” training that allowed HAFA to institute the first federal recognized Hmong bi-lingual and bi-cultural Produce Safety Rules (PSR) Grower training for 42 Hmong farmers who received their Association of Food and Drug Official (AFDO) certification and led four Hmong bi-lingual and bi-cultural staffs in obtaining the Produce Safety Alliance Trainer the Trainer certification that grew the number of Hmong PSA trainers across the United States.

Title: **Latino Immigrant Farmers Trained in Organic Farm Food Safety (LIFT OFFS)**

Author(s): **Nathan Harkleroad**, Agriculture and Land-Based Training Association
Antonio Acosta, Agriculture and Land-Based Training Association

The Agriculture and Land-Based Training Association (ALBA) is a 501(c)3 non-profit organization with a mission to create economic opportunity for limited-resource and aspiring organic farmers through land-based education in the heart of the Salinas Valley. With a 100-acre training facility, ALBA's 5-year Farmer Education and Enterprise Development (FEED) program serves over 70 participants annually. FEED includes a year-long bilingual Farmer Education Course. Graduates of the course can proceed to the Organic Farm Incubator where over four years participants gain access to subsidized land, equipment, and technical assistance in a supportive environment while growing up to 5 acres of organic vegetables and berries

Food safety is an essential component of small farm business management in terms of protecting human health, complying with regulations, and accessing markets. LIFT OFFS addresses an urgent need to provide food safety training and technical assistance. Objectives include: to develop knowledge and strengthen capacity for 120 beginning, Latino-owned farms on the Central Coast with respect to GAPs, FSMA compliance and food safety management. This includes 60 graduates of ALBA's programs (i.e., alumni) and other regional farmers. Another 180 farmworkers, students and food safety professionals will build knowledge and skills through the project. The expansion of services to new groups both at ALBA and around the region is made possible through collaboration with partner organizations, such as, Hartnell Community College.

The methods will include culturally appropriate programming with the use of classroom instruction, demonstration, and one-on-one field, audit and record-keeping assistance. Lessons will be repeatedly reinforced in the classroom, office and the field to gradually enable farmers to gain comfort with independent food safety management.

Title: **Training Beginning, Immigrant, And Organic Specialty Crop Producers in FSMA Compliance to Access Wholesale and Institutional Markets**

Author(s): **Jennifer Hashley**, Tufts University
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As direct produce markets become increasingly competitive, vegetable growers are seeking to sell to larger institutional buyers that have higher food safety compliance standards. Without targeted outreach and novel training approaches, small-scale farmers are challenged to adopt food safety practices, complete audits and certifications, install required infrastructure, and achieve Food Safety Modernization Act (FSMA) compliance. Through New Entry's programs, these underserved audiences will receive technically and culturally accessible food safety training. To date, four New Entry staff members completed the Produce Safety Alliance (PSA) Trainer certification program and facilitated the PSA Grower Training course for 25 small-scale farmers in our local network. New Entry also co-hosted a Commonwealth Quality Program (CQP) webinar with Massachusetts Department of Agricultural Resources (MDAR) which allowed 20 producers to gain detailed knowledge of requirements for the CQP audit program, a certification widely accepted by Massachusetts produce buyers. Our future steps include: updating food safety trainings, creating training videos, supporting third-party certifications, developing case studies, and expanding food safety educational resources for diverse specialty-crop farmers in Massachusetts and New England. We will continue to provide ongoing intensive individual technical assistance to 20+ small-scale and beginning farmers per year through on-farm visits, mock food safety audits, and connections to food safety resources. Through our national network, we will disseminate educational materials that will assist over 2,500 small-scale and under-resourced vegetable producers across the United States to develop appropriate strategies for implementing sustainable on-farm food safety practices. These programs will improve food safety certification and compliance and, as a result, increase small-scale farmer's access to potentially lucrative institutional markets.

Title: **Year one of TRAIN: Targeted Resources Addressing Identified Needs in Maryland Worker Food Safety Training via On-Farm Piloting of a Mixed Media Toolkit**

Author(s): **Shauna C. Henley**, University of Maryland Extension
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The Food Safety Modernization Act-Produce Safety Rule (FSMA PSR) worker training for supervisors focuses on personnel who contact and/or supervise covered produce and/or food-contact surfaces. However, Maryland on Farm Readiness Reviews and PSR inspections consistently document a disconnect between supervisor training and worker performance of duties related to pre-harvest, hygiene, and sanitation. This project aims to provide small and medium sized farms that grow, harvest, pack and hold covered produce with targeted tools for worker training to enhance and sustain an operational culture that champions food safety while supporting workers to provide Americans access to a safe, nutritious and secure food supply.

In year 1, the research team further developed the Maryland Food Safety Network that will strengthen instate communications regarding food safety and provide a conduit for materials to be disseminated from this project. A literature review was undertaken to guide the development of a produce farm supervisor, worker, and volunteer survey instrument to elucidate training tools needed. An online survey using the Qualtrics platform was used. The survey was made available mid-January 2022 and is ongoing. Forty-four partners across the state have assisted in promoting the survey. A $10 gift card raffle is offered to increase responses. Currently, the team is looking at adding semi-structured interviews to the assessment. Survey results will guide the team to develop educational materials and a train-the-trainer toolkit for produce farms with New Mexico State University.

Title: **Expanded Refugee and Immigrant Food Safety Outreach Project in Sacramento**

Author(s): **Tristan Hudak**, International Rescue Committee
Aminah Hassoun, International Rescue Committee

The International Rescue Committee's (IRC) "Expanded Refugee and Immigrant Food Safety Outreach Project in Sacramento" targeted three distinct audiences of refugee farmers throughout the duration of this project: Iu-Mien farmers, Nepali-Bhutanese refugees and Afghan refugee farmers working in the greater Sacramento area. Currently Sacramento has one of the largest Afghan communities in the United States and the population is growing as more refugees are expected to arrive in the area over the next 12 months. The IRC's refugee farmers are not familiar with the rules and regulations around agriculture and food safety practices used in the US, which limits their options for marketing culturally relevant crops within their communities at food stands, grocery outlets, and wholesale buyers. In collaboration with partners at the University of California Agriculture and Natural Resources/University of California Cooperative Extension office (UCANR/UCCE), the IRC planned to directly reach 15 farmers with food safety outreach trainings, while disseminating training resources developed for these farmer groups to national cooperative extension networks and the broader IRC New Roots network. Videos were filmed on six different agricultural practices and produced in three languages, including Iu-Mien, Dari (spoken by the Afghan community) and Nepali, for a total of 18 unique videos. The six topics covered in the videos included: (1) agricultural water, (2) biological soil amendments, (3) chemical use and safety, (4) employee health and hygiene, (5) equipment and tools and buildings (6) land use and animal access. IRC and University of California Davis developed pre-post evaluation and survey tools to monitor the adoption of best practices by the farmers participating in the program, with results and insights to be shared upon completion of the project.

Title: **Water Quality and the FSMA PSR: Developing Risk Assessment and Educational Tools for Farmers and Laboratories in the Upper Midwest**

Author(s): **Annalisa Hultberg**, University of Minnesota Extension
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This project was proposed to meet three specific needs related to produce farms and agricultural water in the upper Midwest, specifically Minnesota and Michigan. This purpose of this project is to create innovative data-based educational tools centered around water testing and risk analysis of agricultural water. Outputs are designed to be transferable beyond this region for broader use. The team has made progress in all three target areas:

1) Water analysis laboratories need guidance to meet the analytical needs of produce farms, including up-to-date information about timelines and requirements in the FSMA Produce Safety Rule (PSR);

A touchpoint analysis was performed to assess laboratory knowledge of PSR requirements related to analytical services. Based on findings, best communications practices were developed and shared with the Michigan Environmental Health Association for dissemination to laboratories and via phone calls to labs within Minnesota. Findings will also be used for further development of lab-oriented outreach, including short videos, factsheets, intake SOPs and decision trees.

2) Producers/growers need guidance to identify and mitigate produce safety risks associated with water use that goes beyond testing for generic *E. coli.*

Existing hazard and risk assessment tools, along with the hazard-based framework of the proposed PSR water rule revision, were used to flesh out the concept of a qualitative agricultural water risk prioritization tool (RPT). The RPT inputs and scoring strategies are under evaluation by a panel of stakeholders. This phase will be followed by field testing and calibration/validation efforts in summer 2022.

3) Educators need tools that are updated to reflect current understanding about water quality used in agricultural production, and (ultimately) published requirements for agricultural water in the PSR.

Using the findings from the development of the RPT, the team will develop video and technology-free demonstration tools for educators to use in trainings or other settings. The first tool developed and produced by the team was a podcast detailing, for laboratories and farms served by laboratories, relevant information about the proposed water rule revision.

Title: **Food Safety Education and Outreach Programming for Plain Growers (Amish and Mennonite)**

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Background and project importance: As the number of limited resource farmers in the US increases there is a need to develop food safety materials and trainings that address such producers. The Ohio State University Fruit and Vegetable Safety Team (OSU FVST) has provided educational outreach services to Ohio's produce growers for on-farm produce safety. The GAPs educational class offered by OSU FVST covers common routes of microbiological contamination on the farm and identifying potential risks and methods of risk reduction.

Objectives: While the GAPs class has been presented to approximately 6000 produce industry stakeholders, it was evident that program availability and delivery methods must be adapted to better meet the needs of Plain growers (Amish and Mennonite) in Ohio and beyond. We have developed Plain Grower GAPs training addressing the unique farming and handling practices, and communication requirements of Plain growers.

Methods: We worked with Plain growers to capture the practices and collect the food safety management examples and solutions from plain farms. The education specialist adapted the language and integrated culture to reflect the community customs and preferences. We used original images. We designed and assembled kits containing models of fresh produce, demo handwashing units, and hands-on education package including the extension educator playbook for each activity.

Results, significance, and main outcomes: We published and piloted the developed Plain grower GAPs trainings with distinct Plain settlements (orders) in Ohio and disseminated materials to using OSU extension network and other states with Plain grower populations. Our publication *Plain Grower GAPs Guide* was awarded 1st place in the OHIO CHAPTER, National Association of County Agriculture Agents (NACAA) Communication Awards 2020.

Title: **Enhancing Food Safety Outreach to Underrepresented Communities through Food Microbiology and Soil Amendments Related Hands-on Workshops**

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Although it is well documented that over 40,000 individuals have successfully completed the Produce Safety Alliance Grower Training, underserved minority groups are often hard to reach for participation in such trainings. Furthermore, for these trainings, there is very little time left for hands-on activities that would reinforce understanding of the concepts addressed. Although traditional lectures are very commonly and widely accepted, research has shown that learners learn best when they actively participate in their learning process (such as with hands-on activities). Therefore, the overall objective of the proposed project was to develop customized food safety education and outreach programs for underserved communities (*including minority, tribal and otherwise socially disadvantaged growers*) that expands upon existing food safety education and addresses the needs of specialized audiences whose educational needs have not been previously or adequately addressed. For this project, the team worked with graduate students at Alabama A&M University (AAMU) to develop laboratory techniques instructional videos that will be used by workshop participants. In addition, graduate students at AAMU mentored undergraduate students in the development of interactive hands-on activities in the area of general microbiology and sanitation. The undergraduate students developed posters and presented their interactive activity at the annual 2022 AAMU STEM Day event. What was developed was piloted with an undergraduate introductory class with no experience with the types of activities developed. The undergraduate students who developed the interactive activities led the effort with the students enrolled in the course. Protocols were edited based on this interaction. This work resulted in the training of undergraduate and graduate students. In addition, training material developed will be used in hands-on workshops where underserved communities will be the target audience.

Title: **A Diversified Approach to Building Training Capacity in Underserved Communities**

Author(s): **Carolyn Jones**, Mississippi Minority Farmers Alliance

Many rural farm communities are underserved by extension and consultants, because of their remoteness, the lack of available training facilities, inadequate staff to devote the necessary time, and the cost associated with training. Although farmers understand the importance of food safety certification, the process is often viewed as another obstacle and expense that reduce profit margins. Farmers learn faster through hands-on training; consequently, our project coordinates services offered by universities, and consultants and emphasize hands-on training to maximize the number of food safety certifications and to build capacity in the community to guide others through the certification process.

Over the course of the grant funding project period our project team works with farmers to develop marketing plans, deliver hands-on technical assistance to farmers on the certification process and assist the farmers in developing an individualized farm plan and Food Safety Quality Manual. To help alleviate the certification cost, the project team assist the farmers in securing cost share funding from the Mississippi Department of Agriculture. A small grant fund is also established using FSOP of $500 for the first audit for those who achieve certification. The project team works with the farmers in establishing a peer training program. The purpose of this program is to reduce the need or external trainers and keep expertise within the community.

Title: **Customized Food Safety Education Strategy for Hard-To-Reach Audiences in the Western Pacific Islands**

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FDA's Food Safety Modernization Act (FSMA) was passed by the US Congress in 2011. It requires food processing, manufacturing, shipping, and other regulated entities to analyze their safety hazards and design and implement controls to reduce or eliminate these hazards. The FSMA improves foodborne illness surveillance systems in the US and most countries exporting food and agricultural commodities to the US. Although foodborne disease and food contamination continue to be significant public health issues across the US territories, commonwealths, and states freely associated with the United States in the Western Pacific, the region has not only been unprepared for the FSMA but also the general food safety education due to a lack of timely training opportunities and geographic barriers.

This project provides food safety education and trainings to extension agents/educators, public health agents, and agricultural professionals as food safety trainers in the region. These trained food safety professionals will then provide current food safety trainings and information to socially disadvantaged and isolated very small farms, processers, and other stakeholders within their jurisdictions.

Due to the global COVID-19 pandemic, our project activities involving international travels for on-site trainings and evaluations have not been conducted as planned. Recently, our first Train-the-Trainer training was successfully offered to the food and public health professionals in Guam and the Commonwealth of the Northern Marianas Islands. As USDA NIFA granted an additional no cost extension for our project, we are expecting to provide the same training to other Western islands including Federated State of Micronesia, Marshall Islands, American Samoa, and Palau as soon as their quarantine restriction allows traveling from/to Guam.

Title: **Sanitation Control Practitioner Program (SCPP) – The Development of an Education Sanitation Program For Small Processors**

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There is a strong need for additional and more targeted training for small processors specific to sanitation. While many of this audience base has had some preliminary training, there is a lack of inherent foundational food safety knowledge that enables them to confidently apply this knowledge into an effective sanitation program. This project builds on the collaborative work of a three-state team to develop accessible, scale-appropriate and motivating content that integrates a multi-modal approach that provides suitable information small processors need to successfully implement a regulatory compliant sanitation program. The goal of this project is to make information regarding cleaning and sanitation accessible and practical with the appropriate tools for small processors to confidently implement and manage a program suitable for their facility and products. A systematic instructional design approach will be followed, starting with the assessment of the true educational and technical support needs of the target audience. The program will be evaluated after implementation to assess the impact of training on the learning objectives. Throughout the development of this project, we are engaging directly with small processors, facilitated by organizational partners, to ensure that the sanitation program content and delivery maintain relevance to this audience. Current project outputs include assembly of an interdisciplinary advisory board, University IRB approval, development of a job task analysis, and implementation of a Delphi assessment to solicit feedback which was used to guide curriculum development. In total, three job roles and 24 job tasks were identified and approved by the advisory board. For each job task, learning objectives were developed and learning actives and assessments were identified. This program will facilitate the long-term goal of increasing the number of processors nationwide in developing, implementing and managing sanitation programs, thus serving to reduce the overall risk of foodborne illness while supporting small businesses.

Title: **Western Regional Center to Enhance Food Safety (WRCEFS)**

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The Western Regional Center to Enhance Food Safety (WRCEFS) is one of four US regional centers that were created in 2015 to foster collaboration in food safety education and stakeholder support of Food Safety Modernization Act (FSMA). Over the years, the Center has been supporting the development of regional food safety education and outreach opportunities for food safety trainers; coordinating a regional communication strategy and ongoing discussions on food safety issues and best practices; collaborating with other regions and regional stakeholders to support the development of food safety training resources; and helping evaluate the impact of education and training activities in the Western region through ongoing program assessment. Since September 2018, the Center has facilitated and/or supported six Produce Safety Alliance (PSA) train-the-trainer (TTT) courses, hosted two produce safety professional development workshops and two Bridging the GAPs: Approaches for Treating Preharvest Agricultural Water On-Farm workshops. During this time WRCEFS partners have also provided numerous educational and training opportunities to our stakeholders, with more than 264 workshops and trainings delivered. Through webinars, WRCEFS has provided trainings on topics such as norovirus on frozen berries, social media tips, and the proposed agricultural water subpart of the Produce Safety Rule. In-person and online meetings, monthly newsletters, the WRCEFS website, and social media are actively used for stakeholder communication. As of April 12, 2022, the WRCEFS website has been viewed 16,372 times; newsletters reached 206 people and Twitter postings have received 31,479 impressions. Since the peer review process launched in April 2021, 19 add-ons have been submitted for review. To date eight add-ons have been accepted and are available on the Food Safety Resource Clearinghouse website (https://foodsafetyclearinghouse.org). The peer review process is currently piloting reviews of three short courses, and guides and video demonstrations of the review process are under development.

Title: **Development and Implementation of a Hands-on Food Safety and Regulatory Curriculum for Members of Shared-Use Commercial Kitchens in Florida**

Author(s): **Matt Krug**, University of Florida
Imran Ahmad, Florida International University
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Food entrepreneurs often utilize shared-use commercial kitchens (e.g., incubators, accelerators) to launch new businesses. Previous survey results, workshop evaluations, and stakeholder feedback have indicated that food safety and regulations are significant hurdles for many food businesses working out of these facilities. Feedback also indicated a need for more hands-on scenarios, examples, and activities. This project aims to develop hands-on curriculum modules, deliver the training to target audiences, and assess short- and medium-term knowledge gains and impacts.

Survey results, along with previous data and feedback, were used to develop a hands-on curriculum that included a basic overview of state and federal food regulations and outlined food safety plan examples that met FSMA's Preventive Controls for Human Food Rule standards. Hands-on activities were developed that focused on sanitation controls and verification activities. To date, seven workshops have been offered using the new curriculum to a total of 86 attendees. Evaluations were collected after each training to measure impacts.

The curriculum developed provides a valuable tool to guide future workshops while leaving attendees with the framework to develop a food safety plan for their products. Participants of the workshops reported their knowledge in six topic areas related to food safety principles and food regulations before and after the training using a five-point Likert scale. Results (n = 86) were analyzed using a paired t-test and indicated a significant increase ($P < 0.001$) in perceived knowledge across all topic areas. Increased understanding of these topics better prepares food entrepreneurs for regulations they may encounter as their businesses grow and limit the potential for adverse food safety events affecting them as they work in a shared environment.

Title: **Supporting Underserved California Leafy-Green Producers' FSMA Compliance, through Interdisciplinary Food Safety, Communication and Marketing Training**

Author(s): **Amanda Lathrop**, California Polytechnic State University
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Using an interdisciplinary approach, this collaborative project seeks to train socially-disadvantaged farmers in California's Santa Maria valley in an essential area - FSMA regulation compliance. Given recent food safety outbreaks in romaine lettuce and the importance of the leafy greens industry to California, we have targeted operators of small and very small leafy green farms in the Santa Maria valley. In this space, our focus has been on Hispanic operators, given documented challenges they face in regulation compliance due to barriers in language, education, and other resources. The project objectives are to provide: (a) PSA grower training to approximately 40 farmers and students, (b) a workshop on agribusiness and crisis communication food safety, and a supplemental grower produce safety workshop, (c) training to Allan Hancock College and California Polytechnic State University (Cal Poly) students in an interdisciplinary approach to food safety, thereby increasing capacities of future food safety experts in the state. To date, we have completed objectives a and c. Two PSA trainings were conducted with a total of 40 participants including both growers and students. During the PSA training, a team of bilingual students provided live translation to Spanish-speaking grower participants. The two follow-up workshops are scheduled for May 20th and June 6th. These workshops will be open to Cal Poly and Allan Hancock college students as well as local farmers on the Central Coast of California. The first workshop will cover best practices in food safety crisis communication, the costs and benefits of food safety compliance, consumer demand for safe foods, and a summary of findings from the economics and communication fields related to food safety. The second workshop will focus on the proposed agricultural water rule, sanitation of harvesting equipment and tools, basic principles of sanitary design, and a discussion of the on-farm readiness review by a California Department of Food and Agriculture inspector.

Title: Engaging Beginning Farmers with Timely and Practical Guidance to Build a Community of Food Safety Practitioners

Author(s): **Martín Lemos**, National Young Farmers Coalition

Our objective is to create opportunities for young farmers and farmers of color to build their expertise in food safety so as to serve as expert supports for their farming communities. We developed opportunities that are tailored to the practicalities of the farmer experience by creating virtual food safety writing classes that can be taken asynchronously and which allow farmers to build their own unique food safety plans; we've developed a food safety fellowship to help build a new cohort of food safety experts among our young farmer community; and we collate resources and tools to help make navigating food safety more accessible for our national network of young farmers and farmers of color.

Title: **Development and implementation of a customized and culturally sensitive FSMA supplemental training program for Hmong farmers: A community outreach project**

Author(s): **Pei Liu**, University of Missouri – Columbia
Touria Eaton, Lincoln University

Although cultural differences between Hmong and Americans present unique food safety challenges, the current Food Safety Modernization Act (FSMA) training program do not address the specific needs for Hmong famers. The long-term goal of this project was to develop a customized and culturally sensitive FSMA supplemental education and outreach training program for Hmong farmers in southwest Missouri. More specifically, the study was to (1) identify the specific needs of Hmong farmers in regard to food safety training and education, and to determine the cultural challenges preventing Hmong farmers from implementing food safety practices, (2) to develop innovative, culturally sensitive, and easy to understand food safety training supplemental materials guided by FSMA, for Hmong farmers, in English and Hmong languages, and (3) to evaluate the developed customized and culturally sensitive food safety supplemental materials by Hmong farmers to assess its usability and potential effectiveness. To date, Hmong farmers (n=5) from southwest Missouri were recruited for a 60-minutes interview to assess the current food safety training needs. The interviews were facilitated by a translator who speaks both Hmong and English. Produce Safety Alliance (PSA) certified trainers (n=5) were recruited for a 60-minutes interview to understand their training experiences while working with the Hmong population. All interviews were audiotaped, transcribed verbatim, and used for the preliminary indexing of concepts and themes. Lastly, observation on Food safety handling behavior were conducted at five Hmong farms (n=5).

All Hmong farmers (n=5) indicated language as their first major barrier when participating in a FSMA training. The second challenge was the training format and the length of the training time. Most Hmong farmers have second jobs and cannot spend three consecutive days at a training. The results of this project indicates that one-day training, hands-on activities, on-farm demonstrations, one-on-one consultations, and printed pictorials were the most preferred and effective training methods on food safety practices for the Hmong farmers. The following step of the project is to take these results into considerations and develop a customized and culturally sensitive FSMA supplemental education and outreach training program for Hmong farmers.

Title: **Short Educational Food Safety Videos (Infotoons) are Preferred and Perform Better Than Plain Text**

Author(s): **Robson Machado**, University of Maine Cooperative Extension
Jennifer Perry, University of Maine Cooperative Extension
Barbara Chamberlin, New Mexico State University
Pamela Martinez, New Mexico State University

Foodborne illnesses are a concern in the U.S. and across the world. Numerous studies have posited that the safety of our food supply depends on a "food safety culture" in the workplace. However, establishing such a culture is not an easy task. It depends on constantly educating food handlers about food safety basic concepts, such as exponential bacterial growth, that require cognitively taxing abstraction levels. To aid food safety educators, we created a series of eight short videos (2~3 minutes) that combine real-life scenarios and animations to make abstract concepts easier to grasp. We named these videos "Infotoons," and two video concepts (exponential growth and cross-contamination) were presented to college students both in text and Infotoon formats to evaluate their efficacy. Half of the survey participants were randomly assigned to watch a video for one theme and read a text for the other theme, with a flipped text/video combination for the other half. Participants were asked how much they knew about each of the themes before and after watching the video or reading the text and their delivery method preference. Three hundred and seventy-eight students from five different classes from three U.S. states' public universities (UMaine, NCSU, and URI) answered the survey. The scores after watching the videos (7.75 points on a scale of 0 to 10) were significantly ($p<0.05$) higher than after reading the texts (7.07 points). The increase in knowledge was significantly ($p<0.05$) higher for videos (3.46 points) than for texts (2.43 points). On a preference scale where 0 was a preference for the text and 10 for the video format, the average score was 8.00, showing a strong preference for the videos. This preference and better efficacy indicate that short educational videos are a viable option for food safety training and a better understanding of harder-to-learn concepts.

Title: **Jumpstart to Farm Food Safety – Farm Food Safety Planning for Small and Medium-Sized Farms**

Author(s): **Robson Machado**, University of Maine Cooperative Extension
Jason Bolton, University of Maine Cooperative Extension
Mary S. Choate, University of New Hampshire Cooperative Extension

The University of Maine Cooperative Extension (UMCE) and the University of New Hampshire Cooperative Extension (UNHCE) are collaborating to provide one-on-one Farm Food Safety Plan (FFSP) writing assistance and on-farm produce safety risk assessments (PSRA) to small and medium-sized produce farms in both states. This project provides a solid foundation for PSRA and FFSP writing and is executed by an experienced farm produce safety educator in each state.

In addition to the one-on-one support to 60 farmers—10 per year per state for the three years of the project—UMCE and UNHCE created a website to be the landing page for all resources developed during this project. The website includes, or will include by the end of the project, webinars' recordings, registration for participation in the project, FFSP resources, and examples of FFSPs completed by farmers. In addition, the project will create a series of three webinars to invite and inform farmers about the project. The introductory webinar was delivered and recorded in early 2022 and is available for anyone to view on the project's website. We had 58 farmers registered for the first webinar, 14 from NH and 44 from ME. In the last year of the project, we will invite participating farmers to provide a testimonial of their experiences. These short videos will showcase farms' successes in the program, and all results will be shared through multiple outlets, including the NECAFS (The Northeast Center to Advance Food Safety) clearinghouse. Currently, we have 23 farms from ME and nine from NH accepted into the program, and we have visited one farm in ME and two in NH.

Title: **Enhancing Produce Safety for Underserved Farmers in Louisiana**

Author(s): **Fatemeh Malekian**, Southern University Agricultural Research and Extension Center
Chelsea Triche, Southern University Agricultural Research and Extension Center
Emily King, Southern University Agricultural Research and Extension Center

Background and Project importance: The farmers need assistance through produce safety trainings especially if they are growing produce that is consumed raw. Food Safety Modernization Act (FSMA) produce safety training and Good Agricultural Practices (GAP) workshops are the two programs that assist the farmers to reduce the risk of microbial contamination of fruits and vegetables during production, harvest, and packaging. These trainings enable them to practice proper procedures for food safety at all times.

Objectives: The objectives were: **1.** To enhance farmers' produce safety knowledge and market access by holding 10 (5 per year) Produce Safety Alliance (PSA) Grower Training in conjunction with Good Agricultural Practices (GAP) Training over the 2-year period, **2.** To reduce produce safety risks by assisting at least 20 underserved farmers to develop and follow Food Safety Plans and **3.** To assist at least 20 farmers to improve their ability to properly carry out produce safety practices and apply for GAP certification program.

Methodology: GAP workshops were conducted after PSA trainings. The farmers were recruited through social media, emails, LDAF newsletter etc. and extension agents from different parishes in the state. Before pandemic PSA training was for one day and on the second day the GAP workshop was conducted. During pandemic the team conducted virtual PSA training in 3 days, the fourth day GAP workshop. The state auditor was present at the workshops and provided feedbacks and necessary information. A total of nine workshops have been conducted,

Results and Key Outcomes: Twenty-five farmers have attended GAP workshops. Six farmers are being assisted with writing their FFSP and five have had their FFSPs edited, they are in the implementation phase. The project coordinator attended two GAP audits with the USDA licensed auditor. Two Mock Audits have been conducted to assist the farmers in preparation to be audited. Twenty-two students have gained knowledge and hands on experiences on developing educational materials for GAP. The project coordinator, PI and students have modified and developed a Farm Food Safety Plan (FFSP), FFSP check list and guide, GAP power point presentations, GAP knowledge assessment, GAP training evaluation, customizable farm map activity board, and a Farm Map Risk Assessment Placemat. These template and materials are being used by other states to comply with their FFSP. The project staff have published a poster and three fact sheets to inform the public, extension personnel, and the farmers. A few comments from training/workshop from attendees: "Having the USDA GAP auditor here was excellent." "Every speaker went above and beyond to present the material in a manner that everyone can understand." "Great Workshop, Thank you!".

Title: **Intertribal Produce-Food Safety Training for Farm-Grown and Traditional Foods**

Author(s): **Jeffrey Mears**, Wisconsin Tribal Conservation Advisory Council

Background: Wisconsin Tribal Conservation Advisory Council (WTCAC) is partnering with the Great Lakes Indian Fish & Wildlife Commission (GLIFWC) and the 1994 Land Grant Lac Courte Oreilles Ojibwe College (LCOOC) to identify and address specific Produce Food Safety needs of our Historically Underserved Tribal governments and producers.

Purpose: To develop a culturally appropriate Tribal Produce Safety Training Series (TPST Series) model that delivers Produce Safety Alliance (PSA) Food Safety Train-the-Trainer Series while also addressing produce safety for wild-harvested and foraged traditional Tribal foods.

Methods: With this project, WTCAC will create a curriculum and model training series (PSA Food Safety Train-the-Trainer Series and the TPST Series) incorporating culturally appropriate Food Safety educational training materials specific to Historically Underserved Tribal Food Producers

Results: This is a very complicated project with a lot of moving parts, partners and deliverables. Planning team partners from WTCAC, GLIFWC, LCOOC, and DATCP have either retired or left their positions. National Partners involved got set back by their staff leaving and Tribal program development being delayed by policy changes from the Food & Drug Administration (FDA) and the Produce Safety Alliance (PSA).

Next Steps: The WTCAC Outreach and Education Coordinator retired at the end of 2021. A new Outreach and Education Coordinator will be starting in May of 2022.

The two GLIFWC staff who were responsible for organizing/coordinating and delivering Tribal Traditional Foods Safety training for wild harvested foods (including deer) left their positions. The positions were posted and should be filled soon.

The LCOOC representative retired at the end of 2021 and a new representative has been named. The planning team will be reconvened in May 2022 and begin work on a new plan to implement the program.

Title: **Sullivan County Food Outreach Project**

Author(s): **Melinda Meddaugh**, Cornell Cooperative Extension Sullivan County

Cornell Cooperative Extension Sullivan County (CCESC) and our partners are working with our stakeholders and fruit and vegetable producers to increase technical assistance to producers exempt from the Produce Safety Rule, increase food safety training opportunities available in the region for small and medium sized farms, provide additional resources to producers covered by the Produce Safety Rule, and provide training and consulting opportunities for producers seeking a third-party Good Agricultural Practice (GAP) audit, through building the capacity of CCESC. The objectives of the Sullivan County Food Safety Outreach Program for Sullivan and Delaware County producers are to increase the food safety knowledge and training for small and medium sized agricultural producers by 60%, while decreasing the number of foodborne illnesses, increase the number of producers with Food Safety Plans and GAP Audits, increase the number of producers that are NYS Grown and Certified and have the ability to sell to the Catskills Food Hub and increase access to safe and nutritious food for low-income communities and decrease foodborne illnesses.

To date we have assisted eight producers with completion of their FSMA plans, while two additional plans are in progress. We have hosted eight workshops: a 2 Day FSMA Training, Writing a Farm Food Safety Plan, FSMA Health and Hygiene with NYCAMH, Organic Certification workshop, Wholesale and Recordkeeping workshop, and a Farm Composting Workshop. In total, 109 producers have attended. We have also developed fact sheets and surveys for data gathering and establishing benchmarks. Since this project was extended, we do not yet have project results and outcomes.

Title: **Extending Food Safety, Sanitation and Quality Training to Primary Processor Employees that have Frontline Interactions with Seafood Harvesters**

Author(s): **Christina A. Mireles DeWitt**, Oregon State University
Virginia Ng, Seafood Products Association
Bruce Odegaard, Seafood Products Association
Brandii Holmdahl, Bornstein Seafoods
Chuck Anderson, Certified Quality Foods

The purpose of this project is to support the expansion of food safety and quality training to an often-overlooked group of individuals at primary seafood processors: fleet managers, dock managers, buyers or equivalent position. Activities included engagement with processors through a pre-meeting survey (December 2019) and meetings on February 20, 2020 and February 11, 2021. Results from these meetings transitioned PIs from sending participants to a larger workshop (Better Seafood Processing School) to developing a targeted training specifically for this cohort. Although a virtual training was suggested for Fall 2021, contacts with processors over the summer indicated there was support for in-person workshops that were local and limited in attendance. In November 2021, the first workshop was held in Astoria, OR. Each of the processing plants in Astoria sent 3-5 participants. Total attendance was 10. Participants were given a knowledge assessment pre- and post- workshop. The knowledge assessment covered topics on chilling, food safety and sanitation, distribution, fish odor decomposition evaluation, and the use of bioimpedance for quality measures. The mean participant score from knowlede assessment pre-workshop was 38%. Post workshop, participants scored 68% on the knowledge assessment evaluation. Participants were also asked to assess the workshop and instructors. For the overall workshop, average participant evaluation was 4.5 out of 5. Suggestions included more species and time for sensory activities and several requests were made to translate the materials used for the workshop into Spanish. Experiences from the first workshop was used to improve/refine the agenda. Repeat workshops are currently planned for May 16 in Newport, OR, May 18 in Westport, WA, and May 20 in Seattle, WA.

Title: **Developing a Handbook of Produce Safety Standards for Buyers**

Author(s): **Elizabeth Newbold**, University of Vermont
Hans Estrin, University of Vermont
Wesley Kline, Rutgers University
Jennifer Matthews, Rutgers University

There are a variety of produce safety standards and verification systems which have led to more complex relationships between producers and buyers. There is a need for educational materials that support easier navigation of the standards to support sustained economic efficiency and produce safety transparency. The goal of the proposed project is to improve produce safety knowledge, communication, and alignment among buyers and producers. We will accomplish this by developing an online Handbook of Produce Safety Standards for Buyers to ease communication and align expectations. To begin, this project has articulated all relevant state and federal specific produce safety standards across the Northeast Region and will begin cross calibrating this fall. This captures the review and summarization of all relevant individual Northeast state and federal voluntary and regulatory produce safety information. We will then develop an Online Buyer Handbook based on specific produce safety standards. This will allow a buyer to search, based on state, the understand state specific voluntary and required standards that impact their selling producer. Finally, we will extend the project results through education and outreach where we will connect buyers to this resource through existing local buyer educational programming supported by partners within the NECAFS network.

Title: **Summarizing and Extending Information from Existing Produce Safety Research**

Author(s): **Elizabeth Newbold**, University of Vermont
Lisa McKeag, University of Massachusetts
Robert Hadad, Cornell University

There is a significant amount of published produce safety research available, however, that collective information is not summarized in an effective way to make it easily useable by educators, technical service providers, inspectors, and growers. The members of the Northeast Center to Advance Food Safety identified the need to share existing research in an approachable way to increase fundamental knowledge and inform on-farm decision making. To address this need, the project team will conduct literature reviews of existing produce safety research and then summarize that into FAQ factsheets, providing a direct benefit to the produce safety community leading to knowledge gain and implementation of food safety practices. Literature reviews will be completed to understand existing research on the following topics: dropped produce, assessment of wildlife contamination, risks associated with wash water, water system inspections, and risks associated with human personal possessions. One review is complete and “Food Safety Risks of Harvesting Dropped and Drooping Produce: A Review” was published in the Journal of Food Protection. https://doi.org/10.4315/JFP-21-369

Title: **The Northeast Center to Advance Food Safety (NECAFS)**

Author(s): **Elizabeth Newbold**, University of Vermont
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Luke LaBorde, Penn State University

The Northeast Center to Advance Food Safety (NECAFS) was established in 2016 with the long-term goal of providing a sustainable, comprehensive food safety training, education, and technical assistance program that assists small- and mid-sized food producers and processors with FSMA compliance. To accomplish this, NECAFS has focused on establishing a regional structure for food safety communication and collaboration, building regional trainer capacity and competency, developing supplemental materials and delivering educational events, evaluating performance, and sustaining good work. This collaborative structure works together to articulate new, tailored and comprehensive activities, to address the specific challenges identified among producers and processors across the region. From there, these specific activities are executed by collaborative efforts across the region. Most notable accomplishments to be developed from this regional comprehensive approach include: The Food Safety Resource Clearinghouse: a central location for produce safety and preventive controls related resources (go.uvm.edu/clearinghouse); a National Water Lab Map: an interactive map that provides location and contact information for water labs capable of completing at least one of the approved tests for the Produce Safety Rule (go.uvm.edu/waterlabmap); creation of Preventive Controls Workgroup that focuses on supporting awareness of the PC rule, evaluation of PC courses, and access to resources for small and very small processors; creation of a Needs Assessment workgroup that conducted a systematic literature review of all published needs assessment across the Northeast summarizing that information into one location; direct funding to support the attendance at PSA, FSPCA, and SSA trainer courses and the delivery of educational programs that teach the associated curriculum; several external grant awards to fund large projects articulated by NECAFS network; and the NECAFS Annual Conference and Meeting that brings together over 150 extension educators, community-based organizations and state department of agriculture to facilitate a 2 day meeting with parallel sessions where these tailored and comprehensive activities are identified.

Title: **Strengthening FSMA Agricultural water outreach and education for produce growers in Kansas and Missouri**

Author(s): **Londa Nwadike**, Kansas State University and the University of Missouri
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Through a 2016 NIFA Food Safety Outreach project and other activities, Kansas State University, the University of Missouri, and Lincoln University have been working together on produce safety outreach related to the Food Safety Modernization Act (FSMA) and have identified water quality as a significant issue. This topic is particularly timely with the current proposed revision to the FDA FSMA water quality provisions. The purpose of this project (funded in 2019 and ending in August 2023) is to improve the safety of produce grown in Kansas and Missouri and improve market access for small-scale Kansas and Missouri growers through increased FSMA compliance. We are implementing the following activities to accomplish this: 1) Developed and administered a survey to 101 Kansas and Missouri produce growers to learn more about their knowledge and current practices related to water quality; 2) Conducted year-long sampling to implement a pilot study to trace sources of generic *Escherichia coli* found in six ponds and one cistern in Kansas and Missouri used for produce irrigation; 3) Established a protocol to validate effectiveness of controlled treatment methods for surface water for post-harvest use and working towards establishing demonstration systems to educate growers on this topic; 4) We have begun to develop a few materials and as the other project activities are completed, we will develop and translate additional training materials to help growers better understand the importance of, and the procedures for, monitoring and improving water quality in produce; and 5) We continue to provide cost-free water testing to Kansas and Missouri produce growers to enhance understanding of their water quality. We are engaging broad audiences in both states as well as the North Central Regional FSMA training center and the Produce Safety Alliance to improve the quality of water used by Kansas and Missouri produce growers.

Title: **Improving Food Safety Practices for Under-served Asian Refugee Farmers**

Author(s): **Kelly Owensby**, Transplanting Traditions Community Farm

Background: The Transplanting Traditions Community Farm (TTCF) is a non-profit organization in the Piedmont region of North Carolina that offers a farm incubator and robust farm training program serving 100% limited resource and socially disadvantaged refugee farmers from Burma.

Objective and Purpose: The TTCF incubator has lacked the resources and capacity to fully address the evolving food safety needs of 14 refugee farmers' businesses. Participating farmers in the TTCF incubator are also experiencing significant growth in both production and marketing, presenting new challenges and gaps in current food safety knowledge, planning, and practice and it is imperative that food safety practices match this growth.

Methods: To address this, TTCF staff have developed culturally and linguistically appropriate, adaptable Food Safety classroom workshop modules, low-literacy visual food safety SOPs, and hands-on training and mock audits. TTCF partnered with the Carolina Farm Stewardship Association to complete the food safety goals and objectives.

Results:

- Baseline Food Safety Assessment completed
- Culturally and linguistically relevant evaluation tool developed
- Eight food safety workshops developed and implemented to date
- Visual SOPs developed in three languages; Karen, Burmese, English and adopted by farmers. Mock audits in production to encourage compliance.
- Food Safety Plan in production

Significant Outcomes: Visual SOPs developed in three languages; Karen, Burmese, English and adopted by farmers. Mock audits in production to encourage compliance.

Title: **Multi-state Initiative to Support Organic Food Processors with Food Safety Compliance**

Authors: Meaghan Donovan, CCOF Foundation
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Heidi Peroni, Washington State Department of Agriculture

The long-term goal of the *Multi-state Initiative to Support Organic Food Processors with Food Safety Compliance* project is to create a culture of informed food-safety decision making, consistent compliance, and a more complete understanding of the Food Safety Modernization Act (FSMA) in California, Washington, and Oregon's small- and mid- scale organic food processor community.

Through thirteen online webinars, five in-person/virtual trainings, and written communications, this project aims to assist small-and mid-sized certified organic processors increase their knowledge of FSMA requirements and current Good Manufacturing Practices (cGMPs), as well as support processors in complying with FSMA regulations.

The first eight webinars of the project reviewed FSMA Preventive Controls for Human Food rule (PCHF) requirements. To gather community feedback on the themes of the remaining webinars and trainings, the project team conducted a poll at the end of each webinar in the series. Because many of the operations that attended the webinars were mixed operations that both grew and processed produce, there was strong audience demand for trainings on the FSMA Produce Safety Rule (PSR), in addition to the PCHF. Project partners accommodated this community need by adding PSR-related trainings to project offerings.

As of May 2022, project partners will have hosted 13 webinars that reached over 450 organic professionals. Webinar topics included FSMA 101 for Organic Processors, FSMA PCHF Qualified Exemption, FSMA PCHF Fully Covered Category, cGMPs, Hazard Analysis, Validation, FSMA Produce Safety 101, and Cottage Food Laws in California and Washington states. In addition, project partners reached over 10,000 organic and non-organic food processors and technical assistant providers through written communications.

Project partners plan to run the remaining five in-person or virtual trainings in the final year of the grant period. Training format will depend on COVID-19 public health recommendations, as well as attendee preference.

Title: **Increasing Accessibility of Food Safety Resources for Farmers and Small Food Processors in Northwest New Mexico**

Author(s): **Lorenzo Reyes**, San Juan College
Erin Havens, San Juan College

In alignment with the economic development priorities, agriculture has been identified as one of the economic drivers of regional economic development. The San Juan College (SJC) Food Hub supports this priority through new business development and technical assistance for entrepreneurs and businesses with value-added production for food processing and manufacturing.

The purpose of this work is to assist the region with economic diversification and recovery from coal-impacted job loss and financial distress.

We work with small, beginning, and socially disadvantaged farms in the Four Corners area. Through this Food Safety Outreach Program, the SJC Harvest Food Hub Kitchen (HFHK) has implemented a training curriculum to reach small farmers and food processors—including our Food Entrepreneurship Applied Training (FEAT) and expand our existing "Growing Your Farm Business" - food safety training programs.

Four new businesses have expanded their operations. Approximately 45 people have attended training through the Harvest Kitchen, and 15 have received one-on-one mentorship. In addition, 46 farms have been trained on the food safety component so far.

The goal is to be a comprehensive training hub, provide the necessary resources and support to ensure that small farms and food entrepreneurs can meet required food safety regulations and contribute to the community and sustained economic growth and diversification in the region.

Title: **Immersive Food Safety Training to Support Technical Assistance for Small and Mid-Sized Farmers**

Author(s): **Juliana M. Ruzante**, RTI International
Ellen Shumaker, North Carolina State University
Benjamin Chapman, North Carolina State University
Renee Boyer, Virginia Tech
Lester Schonberger, Virginia Tech

RTI partnered with Virginia Tech and North Carolina State University to develop and deliver innovative and highly engaging training, education, and outreach materials that provide small and mid-sized operations with interactive learning modules on pre- and post-harvest water sampling and testing and soil amendments. Virtual tours of a small diversified produce operation and a farmers' market were also developed to enhance the in-person food safety training conducted by both university partners and designed for the targeted audience. The curriculum is aligned with FSMA rules, leveraged Produce Safety Alliance materials, and was developed under the guidance of a steering committee composed of nine representatives of small and mid-sized producers and extension specialists working directly with them. Articulate360® as used to develop the water sampling and testing and soil amendments online courses, which are available in English and Spanish via NCSU's website. The courses take between 20 to 30 minutes to be completed and have interactive questions to gage the participants understanding and keep them engaged. The pre- and post-harvest water course has 8 sections that cover important definitions, different water sources and their risks, microbial testing, sampling frequency, methods, and the interpretation of laboratory results. The soil amendments module has 6 sections which explain their different categories, focusing on raw manure and composting. The risk associated with soil amendments and best practices to reduce the microbial risk are also discussed. The course includes a section on working with supplies to ensure the safety of the soil amendment being purchase.

The farmers' market and the diversified farm virtual tours were developed using a 360 framework and include pop-up text boxes with key information and quizzes. They are deployed into Oculus Quest 2 headsets and will be integrated into the food safety training courses being conducted by NCSU and VTech this summer.

Title: **Collaborative Food Safety Education and Training for the Deaf and Hard of Hearing Farmers in the Pacific Northwest**

Author(s): Hyun J. Lee, University of Idaho
Joelynne Ball, Idaho Educational Services for the Deaf and the Blind
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Food safety is an important public health issue. While the Food Safety Modernization Act (FSMA) Produce Safety Rule (PSR) has been implemented, it has been challenging for growers operating small and very-small farms with limited resources. More seriously, the Deaf and hard of hearing farmers have not been able to access the necessary training to comply with FSMA PSR due to the lack of adequate training programs designed for this underserved population as well as insufficient funding and outreach efforts. Hence, developing a culturally sensitive education program for Deaf and hard of hearing learners will be of essential. Development of a customized pedagogical model is also necessary to ensure effective delivery of educational programming and maximum learning outcomes.

The objective of this project is to develop and implement a customized produce safety education program for the hard-to-reach and socially disadvantaged target population; the Deaf and hard of hearing farmers in the Pacific Northwest. In addition, an interactive curriculum based on the Understanding, Implementation, and Support Model will be developed while maximizing the utility of food safety education programs developed during the previous study. A total of 90 Deaf and hard of hearing farmers from the Pacific Northwest (Idaho, Oregon, and Washington) will be recruited and trained in collaboration with the partner organizations including schools for the Deaf in the region.

Title: **The Southern Regional Center for Food Safety Training, Outreach, and Technical Assistance Continuation, and Lead Regional Coordination Center**

Author(s): **Keith Schneider**, University of Florida
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Compliance with the Food Safety Modernization Act's Produce Safety Rule (PSR) and Preventive Controls for Human Foods Rule (PCHF) requires training, outreach, and technical assistance for owners and operators of small and medium-sized farms, beginning farmers, socially disadvantaged farmers, small food processors, and small fruit and vegetable wholesale merchants. The Southern Center for FSMA Training (SC) is a consortium of 22 institutions aimed at enhancing produce safety in 13 southern states and two territories through a variety of educational means, including conducting and evaluating standardized courses (Produce Safety Alliance (PSA) and Food Safety Preventive Controls Alliance (FSPCA) Preventive Controls Qualified Individual (PCQI)) targeting the PSR and PCHF. Validated pre/post-tests were given at PSA and FSPCA courses to assess short-term knowledge gains from September 2018-September 2021 across the south. There have been 29 FSPCA trainings with 305 attendees and 206 PSA trainings with 3,582 attendees reported during this timeframe. Additionally, members of the SC have held, in collaboration with southern state departments of agriculture, three Southern Region Integrated Produce Safety conferences. In collaboration with the PSA, the SC planned and held two PSA Advanced Trainings (n=51); another one is scheduled for June 2022. The SC has also facilitated PSA Train-the-Trainer courses and 30 have been held in the south so far with each state in the southern region hosting at least one. Members of the SC have continued to create FSMA specific resources for growers and processors. The Lead Regional Coordination Center operates to promote produce safety, communication, and collaboration between the four regional centers at a national level.

Title: **Ensuring Food Safety Competency of Produce Growers and Processors in the NCR Through Expanded Collaboration with Diversified Populations**

Author(s): **Angela Shaw**, Iowa State University
Ellen Johnsen, Iowa State University

The overarching goal of the North Central Region Center for FSMA Training, Extension and Technical Assistance is to continue to support the national food safety program by coordinating information within the NCR through communication, collaboration, education, training, technical assistance, and development of new food safety materials. This requires implementation of needs assessments for diversified and underserved grower and processor audiences and the continued education and training of regional food safety trainers, growers, processors, and supporting these partners by providing technical assistance.

Our central hypothesis is that targeted food safety education, professional development opportunities and access to technical assistance will provide the crucial tools for diversified and underserved growers and processors to facilitate compliance with food safety regulations.

The specific objectives of this project are to: Objective 1: Expand the produce safety network within the NCR to include underserved produce industry partners, more and more diverse producer, processors, and educators; Objective 2: Collaborate with and support the NCR produce safety network.; Objective 3: Create, modify, and validate produce safety training materials based on a needs assessment, focusing on underserved and diverse production and processing environments and new educators; and Objective 4: Professional development and technical assistance of NCR produce safety educators, growers, and processors. We utilize a formal evaluator to ensure that the objectives and milestones are met in this project.

The NCR FSMA hosted a 2022 virtual annual conference and several other training/discussion events. We convened meetings for educators who work with niche audiences and is supporting the development of new resources for those audiences. Meetings are held for educators, inspectors, program managers, and those in charge of state inventories.

The NCR FSMA provides funds for trainer sharing, professional development, training assistance, and translation services. Success stories highlight the work of partner educators and regulators.

Title: **Continuing Implementation Of Fsma In The North Central Region Through A Stakeholder Engagement Framework**

Author(s): **Angela Shaw**, Iowa State University
Ellen Johnsen, Iowa State University

The overarching goal of this project is to support the infrastructure of the national food safety program by communicating and coordinating information within the North Central Region (NCR) related to FSMA's Produce Safety Rule and Preventive Control Rule through education, training, and technical assistance. Our central hypothesis is that region-specific FSMA education and access to technical assistance will provide the crucial tools for growers, processors, and vendors to facilitate compliance with FSMA regulations. During the no-cost extension year of this grant, the objective was to focus on professional development, a long-term behavioral assessment of produce growers who took produce safety trainings in more than 4 years ago, and mini-grants for niche audience projects. As a result, a virtual focus group and online survey were utilized to facilitate topics for the NCR FSMA monthly listening sessions, topics for the 2022 annual conference, and three professional development events. These planned events include a virtual, Train the Trainer Bridging the GAPs: on May 19th and 20th, 2022, an in-person Water Day Event on June 16th and 17th, 2022, and a 2 ½ day virtual, Environmental Monitoring short course on June 28th and 30th, 2022. Currently, the grant team is completing a long-term behavioral change study that includes 50 in-depth interviews with growers across the region. Results will be placed in a peer-review journal article. Three mini-grants were awarded to 1. Develop a farm worker texting service translation to Spanish to relay on-farm produce safety information every week; 2. Design three technology non-chemical solutions to cleaning tools and equipment that are affordable for small and small growers; and 3. Design a mobile processing cart for fruit and vegetable processors to be used within a licensed kitchen. These projects have been presented during the NCR FSMA Listening Sessions.

Title: **Food Safety Education for Korean Speaking Specialty Fruit Growers in California**

Author(s): **Luis Sierra**, California Center for Cooperative Development
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The Korean speaking farming communities are concentrated in the Lucerne Valley of San Bernardino County, where farmers have established jujube orchards (*Ziziphus jujuba*) over the past 15 years. The long-term goal of the proposed activities is to support a culture of informed food-safety decision making, consistent compliance, and a more complete understanding of the Food Safety Modernization Act's (FSMA) Produce Safety Rule in the small-scale, mostly organic, and Korean-speaking farm communities in California. Specific objectives of this project are to (i) help small, organic, and Korean-only speaking growers satisfy the FSMA Produce Safety Rule requirement outlined in § 112.22l; (ii) increase small scale, organic, and Korean-only speaking grower knowledge of FSMA Produce Safety Rule requirements; and (iii) increase small scale organic, and Korean-only speaking grower understanding and implementation of the Good Agricultural Practices (GAPs) outlined in FSMA.

The project began in October 2019 and has focused on translating the PSA curriculum and additional items included in the binder. After the statewide laws restricting in-person gatherings, and consultations with High Desert Jujube Cooperative, we opted to wait until in-person trainings were possible. Since March 2022, we have (i) conducted three supplementary workshops focused on exclusions/exemptions, worker health and hygiene, including heat illness prevention, and water quality; and (ii) set dates for the three PSA trainings. We have also developed bilingual outreach materials to announce the trainings and completed PSA curriculum translation.

Title: **Food Safety Management and Document Development for PCHF Rule Qualified Exemption Eligible Food Facilities**

Author(s): **Abby Snyder**, Cornell University
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The Preventive Controls for Human Food (PCHF) Rule of FSMA provides small and very small manufacturers qualified exemptions from parts of the rule, notably the need for a formal hazard analysis and preventive control plan in Subparts C and G. However, these facilities are still required to follow current Good Manufacturing Practices (GMPs) as well as requirements for record keeping and training. The goal of this project is to increase FSMA preparedness among qualified exemption-eligible food processors through a national training program that includes 1) the curriculum development, 2) training sessions and guidance to food processors in collaboration with in-state partners, and 3) the development of online (asynchronous) training to facilitates remote access. The project was initiated in 2019 and the development of curriculum and training sessions pivoted to remote webinars and small group Q&A sessions because of the COVID-19 pandemic. To date, we have offered 23 courses to >2,000 very small food processors in 11 states. Courses were taught in English and Spanish, offered in both synchronous and asynchronous modalities, and varied in structure and pacing based on collaboration with our in-state partners. A clear positive outcome from virtual education involved improved accessibility among many audiences due to reduced travel costs and increased audio-visual options. However, we noted that some populations were less well served by virtual education because of limited access to technology resources. We found that participant engagement could be drastically enhanced through the strategic use of chat functions, breakout rooms, and office hours, with a focus on applying Bloom's taxonomy to the learning outcomes for food safety education. Positive post-course participant feedback suggested that, when pandemic-related restrictions relax, the opportunities available in virtual food safety education will remain an important, complementary option to in-person trainings to improve accessibility, engagement, and learning outcomes in the future.

Title: **Engaging Asian American and Pacific Islander (AAPI) Grower Educational Needs for Safe Fruit and Vegetable Production in Hawai‘i and California**

Author(s): **Sharon Wages**, University of Hawai‘i at Manoa
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Nationally, AAPI growers constitute 28,000 growers, earning $7.5 billion in annual produce sales, but they can have difficulty in accessing critical food safety information like FSMA-PSR due to limited English proficiency. The project entitled “Engaging Asian American and Pacific Islander (AAPI) Grower Educational Needs for Safe Fruit & Vegetable Production in HI & CA” aims to provide Food Safety Modernization Act – Produce Safety Rule (FSMA-PSR) resources to socially-disadvantaged AAPI fruit and vegetable growers in Hawaii and California. The project team proposes to 1) Translate the Western Institute for Food Safety and Security (WIFSS) supplementary FSMA-PSR e-course and associated resources into Ilocano and Mandarin for AAPI growers in Hawaii and California, 2) Identify and address gaps in course curricula and content by obtaining feedback from stakeholders, 3) Migrate the FSMA-PSR online course and resources to a dedicated website that can support demand and user traffic, and 4) Conduct FSMA-PSR outreach to AAPI growers and stakeholders, which includes PSA Grower Trainings and workshops showcasing the newly translated e-course website and materials. The team will collaborate with partners such as the Produce Safety Alliance and the Western Region Center to Enhance Food Safety to gather feedback and disseminate project outcomes to agricultural stakeholders. This project will reduce barriers commonly faced by hard-to-reach, underserved, socially disadvantaged groups such as AAPIs. Completion of this project will allow more AAPI growers to meet FSMA-PSR compliance, produce safe fruits and vegetables, and access markets that may have previously been beyond their reach.

Title: **Farm Food Safety Training for Local and Immigrant Crop Producers in Hawai‘i**

Author(s): **Sharon Wages**, University of Hawai‘i at Manoa
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In Hawai‘i, the agricultural workforce is largely made up of local and immigrant crop producers whom many are Limited English Proficient (LEP). Over 25% of Hawai‘i’s population speaks a language other than English at home. Of those languages, the top 3 are Ilocano, Tagalog, and Japanese. The University of Hawai‘i Manoa College of Tropical Agriculture and Human Resources Cooperative Extension works directly with the agricultural industry in Hawai‘i, and Ilocano has been identified as one of the major languages spoken by edible crop producers. Being able to offer educational materials and the required curricula in the appropriate language, Ilocano, will enable Hawai‘i edible crop producers and their businesses to meet regulations, operate legally, and maintain market supply. With the translated materials from this project, we will be able to adequately support the Ilocano-speaking grower population by conducting the PSA Grower Training and supporting on-farm food safety practices, thus supporting Hawaii’s current and future production of safe fresh fruit and vegetables.

Title: **Assisting Small- and Medium-Sized Farmers Through Cross-State Collaboration**

Author(s): **Tricia Wancko**, National Farmers Union Foundation

Local food producers in the Midwest region, often small-scale diversified farming operations, face unique challenges in complying with FSMA regulations. Our target audience consists of small-to mid-sized farms, beginning farmers, socially disadvantaged farmers, and English-as-a-second-language (ESL) populations in four Midwestern states: Minnesota, Wisconsin, Iowa, and Indiana. Existing resources and infrastructure may not meet the target audience's distinct set of food safety needs and resource-strapped growers may have difficulty accessing scale-and culturally appropriate education and resources. Accordingly, this project aims to mitigate short-term barriers to knowledge acquisition and implementation so that a diverse population of local food producers can effectively identify and adhere to relevant food safety practices through promoting and facilitating access to food safety training, education, and technical assistance.

Methods include: 1) Deliver training and education tailored to the needs of the target audience; 2) Leverage online platforms to equip producers with readily accessible resources; 3) Provide individualized technical support to producers; 4) Reduce language barriers to accessing education and training for ESL producers; 5) Reduce the cost associated with attending trainings and workshops; and 6) Promote awareness about food safety regulations and coordinate with educators and regulators to expand the reach of training, education, and assistance.

NFUF has partnered with Farmers Union State Divisions in collaboration with local University Extensions, Departments of Agriculture, and community-based organizations to execute this project. In year one, project partners: 1) Hosted or supported 9 workshops/PSA Grower Trainings reaching 266 participants (including Plain growers); 2) Produced 4 "Tech Talks" on qualified exemptions, record keeping, cleaning and sanitizing, and worker training as well as "Lunch & Learn" webinars in addition to promotion of a food safety podcast; 3) Supported 2 on-farm field days on post-harvest handling reaching 20 BIPOC growers in addition to providing direct assistance to 16 growers; 4) Supported the development of 10 factsheets in Spanish and Hmong and delivered 1 Spanish-language training on worker health and hygiene; 5) Provided financial support to 232 growers to attend workshops and trainings; 6) Attended 10 conferences/events and published 60 social media posts/newsletters to promote food safety awareness, educational opportunities, and resources in addition to developing robust organizational partnerships and connections throughout the Midwest region.

Title: **Building the Capacity of Community-Based Produce Safety Education for Hard-to-Reach Farmers in the Mid-Atlantic**

Author(s): **Tracy Ward**, Easton Economic Development Corporation
Lindsay Gilmour, Organic Planet LLC
Aleya Fraser, Chesapeake Harvest

The project seeks to build the capacity of a cohort of trained African American and community-based produce safety educators and foster a culture of food safety among specialty crop producers in the Mid-Atlantic region through education and one-on-one coaching. We focus on outreach to economically disadvantaged, urban, and hard-to-reach specialty crop farmers in the region while training our community-based food safety educators to provide peer-to-peer mentorship that helps farmers recognize and reduce risk and develop and implement scale-appropriate procedures and practices on their farms. Recognizing that farmer-to-farmer and peer knowledge exchange leads to higher rates of implementation of new practices, the goals of this project are to deliver multiple tiers of skills and leadership development training and mentorship in produce safety, food safety plan writing, and post-harvest handling to emerging food safety educators who are leaders in their farming communities; give them opportunities, both on-farm and web-based, to teach their peers; and while doing so provide beginner and established farmers with education and coaching on best practices in food safety, plan-writing, and wholesale appropriate post-harvest handling. Our educator team is also working to enhance competitiveness and market reach of 28 urban and small-scale specialty crop producers through on-farm risk assessments, one-on-one assistance to write food safety plans, and wholesale readiness training to prepare them to comply with buyer requirements, food safety laws and certifications as they scale up to enter wholesale markets. Operating in a pandemic has led us to produce several “on-farm” videos that enhance the virtual learning experience, and to create a new, video database friendly website that includes a produce safety toolkit for educators and farmers, as well as a platform for social engagement.

Title: **Experiential Learning Opportunities for Limited Resource Growers through Mobile Farm Innovation in Mississippi, Alabama, and Georgia**

Author(s): **Kristin Woods**, Auburn University
Camila Rodrigues, Auburn University
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The overarching goal of the project Experiential Learning Opportunities for Limited Resource Growers through Mobile Farm Innovation in Mississippi, Alabama, and Georgia is to meet the critical challenge to farm viability faced by socially disadvantaged, limited resource, minority growers in the region who are trying to balance food safety and conservation concerns. This customized food safety training builds on the food safety resources previously developed and meets the needs of the growers in this region by focusing on experiential learning and face-to-face technological support. With the growers' long-term food safety, conservation, and financial viability in mind, the objectives of the project are to 1) develop three Mobile Farm Innovation Units equipped with multiple experiential, visual, and technological training aides; 2) develop curriculum to accompany the Innovation Units; 3) provide outreach to socially disadvantaged, limited resource, and minority growers in Mississippi, Alabama, and Georgia; 4) and evaluate the effectiveness of the program. The project has generated 9 factsheets and activity facilitator guides, 8 screen casts, 4 videos, and facilitated 7 events. Preliminary results indicate that 100% of hands-on workshop attendees report improvements in knowledge and confidence related to implementing produce safety practices. Additionally, participants report intent to implement practices on farm (i.e., on farm handwashing, cleaning/sanitation, developing a farm map, etc.), except for implementing on farm cold storage. Successful implementation will be assessed during follow-up focus groups. Given the lack of intent to implement on farm cooling, it is possible that funds to implement practices are a challenge that will need to be addressed before implementation is possible for limited resource growers.

Title: **Collaborative food safety education program for Louisiana retail/manufacturing crossover businesses**

Author(s): **Wenqing Xu**, Louisiana State University AgCenter
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Background and project importance: New trends are driving businesses to cross over from retail to manufacturing, blurring the lines between industries. Spanning across both areas enables limitless potential and growth of food businesses, but also makes it difficult to establish the food safety programs to meet the requirements necessary to succeed.

Objectives: The overall goal of the proposed project is to assist existing crossover businesses or businesses who are considering crossing over the lines between retail and manufacturing. We will help them identify applicable food safety regulations and provide customized educational modules to that will allow them to fulfill regulatory requirements.

Methods: A comprehensive needs assessment will be developed and administered to LDH personnel to assess both regulatory and crossover food businesses' needs. The LSU AgCenter and LDH team will develop an educational package customized to crossover businesses.

Results: We have a better understanding of the landscape of crossover businesses in Louisiana. Most popular specialized processes at retailers were identified. The regulation and food safety training needs of the crossover food business owners were assessed. The eLearning module building is on-going.

Significance or key outcomes: The strategic collaboration between Louisiana State University Agricultural Center (LSU AgCenter) and the Louisiana Department of Health (LDH) is critical for achieving the above goals. The educational modules developed by the LSU AgCenter will be implemented through LDH sanitarians. The impact of the proposed project is expected reach statewide.

Title: **Closing the GAPs: Food Safety Education and Outreach to Underserved Communities in the Lower Rio Grande Valley**

Author(s): **Veerachandra Yemmireddy**, University of Texas Rio Grande Valley
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Underserved Hispanic fresh produce growers in the Lower Rio Grande Valley (LRGV) region of South Texas are in dire need of food safety educational programs to help manage food safety risks and improve their market access. These growers face significant obstacles in navigating through current regulatory and buyer driven market requirements in addressing local food safety issues and are currently underserved by existing food safety programs. The purpose of this project is to provide bilingual produce safety education and outreach to Hispanic growers in the LRGV and build training capacity to identify and address their food safety educational needs. The University of Texas Rio Grande Valley in partnership with multiple CBOs and NGOs in the region has identified local needs and developing customized bilingual produce safety training workshops with hands-on activities consistent with current FSMA guidelines. These training materials will be submitted to NECAFS cleaning house for peer-review prior to deploying them in LRGV starting from Summer 2022. In addition, a cadre of lead trainers and trainers will be developed to support current and future educational and outreach needs. In February 2022, three new trainers obtained their PSA grower training certificates and are currently assisting in project activities. Project external evaluator in collaboration with project team and grower partners developed an evaluation rubric to develop surveys and evaluate the impact of the program. After successful deployment of training workshops, the project team along with cadre of developed trainers will provide technical assistance for growers to earn industry recognized credentials. A minimum of 240 growers and 30 students obtaining agriculture and related degrees will take part in these workshops. We anticipate 40% of attendees will develop farm food safety plans, 25% implement risk mitigation practices and 10% will be able to obtain GAP and GHP certifications to improve their market access.

Title: **College of the Sequoias Delivers FSMA Training for Small and Mid-sized Farms and Processors**

Author(s): **Jorge Zegarra**, College of the Sequoias
Laurel Garver, College of the Sequoias
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This collaborative project between College of the Sequoias Community College District and State Center Community College District as well as the Central Valley Food Safety Committee is enabling small and mid-sized farms, beginning farmers, socially disadvantaged farmers, small processors, and small fresh fruit and vegetable merchant wholesalers to enhance their competitiveness by ensuring compliance to the Food Safety Modernization Act (FSMA). The aim is to grow training, education, outreach and coordination efforts for California's Central Valley farmers with the adoption of FSMA requirements by providing local and affordable food safety trainings/meetings.

Objectives of the project include coordinating and preparing 50 specialty crop producers for FSMA Produce Safety inspections and to deliver training to at least 1,100 individuals in at least 55 training sessions of the following FSMA-related topics: Produce Safety Rule Grower Training, Good Agricultural Practices, Hazard Analysis Critical Control Points, Foreign Supplier Verification Program, Preventive Controls for Human Foods and Beyond Basics Produce Safety. The project will measure success by the number of farmers prepared for produce safety inspections, trainings offered, number of participants trained and number of participants who increased knowledge of food safety skills.

For the College of the Sequoias, 31 trainings were delivered with 232 participants completing the course(s). Of these course completers, 171 increased food safety knowledge. At the State Center Community College District, Advisor and consultant selections were completed to coordinate and prepare specialty crop producers for FSMA Produce Safety inspections. The consultant is in the process of screening specialty crop producers and will soon be scheduling onsite mock audits. They have also delivered 24 trainings with 665 participants completing the courses (236 in Produce Safety and 429 in GAP Spanish).

Additionally, work with the Central Valley Food Safety Committee has resulted in four food safety industry luncheons, bringing Bob Whitaker, Sonia Salas, Thais Ramos and Veronica Ramos to the Central Valley as guest speakers on food safety topics.