



# FEED THE FUTURE

The U.S. Government's Global Hunger & Food Security Initiative



## FY2022 ANNUAL REPORT

FEED THE FUTURE INNOVATION LAB FOR FOOD SAFETY



Cornell University

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# **Feed the Future Innovation Lab for Food Safety (FSIL)**

**Annual Report  
October 1, 2021 - September 30, 2022**

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## Management Entity

The Feed the Future Innovation Lab for Food Safety (FSIL) is jointly managed by Purdue and Cornell Universities. The management entity provides technical leadership that guides USAID's food safety research agenda while ensuring effective management and implementation of all activities within the FSIL portfolio. FSIL's management team and technical experts leverage extensive experience in international food safety research, education, and extension to develop and manage a portfolio of food safety and capacity development activities.

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Gellert Family Professor in Food Safety  
Cornell University

## Advisory Committee

The FSIL Advisory Committee is critical to meeting the Innovation Lab’s goal of reducing the burden of foodborne disease and strengthening the food safety of nutrient-dense foods through transformative partnerships across academic, public, and private sectors. The management entity relies on Advisory Committee members to counsel FSIL on research priorities, represent FSIL in various capacities, and serve as a resource and support for FSIL research subaward processes.

The Advisory Committee consists of private sector experts in food safety, government agency representatives, and experts in cross-cutting themes.

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**Howard Popoola**

Vice President, Corporate Food Technology  
and Regulatory Compliance  
The Kroger Co., GFSI Board Member

## Where the Innovation Lab Works



The Food Safety Innovation Lab maintains four long-term projects in its initial focus countries of Bangladesh, Cambodia, Kenya, and Senegal. Additional two-year projects were funded in Nepal and Nigeria in FY2022.

## List of Program Partners

<b>U.S.</b>	Arizona State University
	Cornell University
	Kansas State University
	Penn State University
	Purdue University
	Tennessee State University
	Texas State University
	The Ohio State University
	Tuskegee University
	University of Alaska Fairbanks
	University of Connecticut (May 1-June 30, 2022)
	University of Florida
	University of Georgia
	Utah State University
<b>Bangladesh</b>	Bangladesh Agricultural University
	University of Dhaka
<b>Cambodia</b>	Center of Excellence on Sustainable Agricultural Intensification and Nutrition
	Institut Pasteur du Cambodge
	Institute of Technology Cambodia
	Royal University of Agriculture
	World Vegetable Center
<b>Kenya</b>	Kenya Medical Research Institute
	University of Nairobi
<b>Nepal</b>	Agriculture and Forestry University
	SAHAVAGI
<b>Nigeria</b>	Bowen University
	Obafemi Awolowo University
	University of Ibadan

**Senegal**

Conseil National du Développement de la Nutrition

Institut de Technologie Alimentaire

Institut Sénégalais de Recherches Agricoles

## Acronyms

<b>AoI</b>	Area(s) of Inquiry
<b>ANNH</b>	Alaska Native and Native Hawaiian-Serving Institution
<b>AOR</b>	Agreement Officer's Representative
<b>BAU</b>	Bangladesh Agricultural University
<b>BFRI</b>	Bangladesh Fisheries Research Institute
<b>CE SAIN</b>	Center of Excellence on Sustainable Agricultural Intensification and Nutrition
<b>CERFLA</b>	Centre d'Etudes, de Recherche et de Formation en Langues Africaine
<b>CITI</b>	Collaborative Institutional Training Initiative
<b>CNDN</b>	Conseil National du Développement de la Nutrition
<b>DEIA</b>	Diversity, Equity, Inclusion, and Accessibility
<b>DDL</b>	Data Development Library
<b>EMMP</b>	Environmental Mitigation and Monitoring Plan
<b>FAO</b>	Food and Agriculture Organization of the United Nations
<b>FS</b>	Food Safety
<b>FSIL</b>	Innovation Lab for Food Safety
<b>FY</b>	Fiscal Year
<b>GFSI</b>	Global Food Safety Initiative
<b>GFSS</b>	Global Food Security Strategy
<b>HBCUs</b>	Historically Black Colleges and Universities
<b>IBC</b>	Institutional Biosafety Committee
<b>IL</b>	Innovation Lab
<b>IPC</b>	Institut Pasteur du Cambodge
<b>IR</b>	Intermediate Result
<b>IRB</b>	Institutional Review Board
<b>ISEP</b>	Institut Supérieur D'Enseignement Professionnel
<b>ISRA</b>	Institut Sénégalais Recherches Agricoles
<b>ITA</b>	Institut de Technologie Alimentaire
<b>ITC</b>	Institute of Technology Cambodia
<b>KEMRI</b>	Kenya Medical Research Institute
<b>ME</b>	Management Entity
<b>MEL</b>	Monitoring, Evaluation, and Learning
<b>MSI</b>	Minority Serving Institution
<b>NASNTI</b>	Native American Serving Non Tribal Institution
<b>NGO</b>	Non-governmental Organization
<b>OSU</b>	The Ohio State University
<b>PCR</b>	Polymerase Chain Reaction
<b>PI</b>	Principal Investigator
<b>RFA</b>	Request for Applications



<b>RUA</b>	Royal University of Agriculture, Cambodia
<b>SAM</b>	System for Award Management
<b>TOC</b>	Theory of Change
<b>USAID</b>	United States Agency for International Development
<b>WLP</b>	Women's Leadership Program
<b>WTP</b>	Willingness to Pay
<b>WP</b>	Work Plan

## Table of Contents

Management Entity	i
Advisory Committee	ii
Where the Innovation Lab Works	iii
List of Program Partners	iv
Acronyms	vi
Executive Summary	1
Research Program Overview and Structure	2
Theory of Change (TOC) and Impact Pathway	3
Focus Country Key Accomplishments	4
Bangladesh	4
Cambodia	4
Senegal	5
Nepal	5
Nigeria	5
Research Project Reports	7
Human and Institutional Capacity Development	18
Short-term training	18
Long-term training	20
Environmental Mitigation and Monitoring Plan (EMMP)	22
Open Data Management Plan	23
Governance and Management Entity Activity	24
Other Topics	26
Issues	30
Future Directions	31
Appendix A – List of Awards to U.S. Partners	33
Appendix B – Success Stories	35

## Executive Summary

As travel and institutional pandemic restrictions eased globally, the Feed the Future Innovation Lab for Food Safety (FSIL) accelerated research activities in all focus countries. FSIL's four long-term research subawards in Bangladesh, Cambodia, Kenya, and Senegal entered their second year of implementation. These projects were in the data collection stage of their project cycles for most of FY2022.

The expansion of research activities was paralleled by an increase in the number of short- and long-term training programs supported by FSIL. A total of 27 graduate students have received support from FSIL to date, including 19 female students. Short-term training activities were implemented virtually and in person by FSIL subawardees, with a total of 407 trainees (222 females and 185 males) in FY2022 representing the private sector, government, producers, and civil society.

FSIL maintains a strong focus on elevating diversity, equity, inclusion, and accessibility throughout all activities. In FY2022, FSIL concluded its second competitive Request for Applications (RFA) process, which focused on Minority Serving (MSI)-led partnerships for global food safety research. Of the six full proposals that were reviewed, two were selected for funding for two years and approximately \$400,000 each. The project in Nepal is led by Tennessee State University, a Historically Black College/University (HBCU), and started activities in March 2022. FSIL's project in Nigeria began in May 2022 and is led by the University of Alaska Fairbanks, which is designated as both an Alaska Native and Native Hawaiian Serving Institution (ANNH) and a Native American-Serving Nontribal Institution (NASNTI). As both principal investigators and their research teams were new to implementing USAID-funded projects, the FSIL management team conducted a series of onboarding activities to introduce key policies and procedures.

The FSIL management team continued to monitor and guide subaward activities through regular meetings and site visits. To promote knowledge sharing across projects, the program's first hybrid annual meeting was held in November 2021, and the second FSIL virtual project exchange occurred in May 2022. The FSIL Gender Working Group met quarterly throughout the year, offering project gender experts an opportunity to exchange updates and recommendations. A public-private partnership with Neogen was developed in support of FSIL's project in Nigeria. Finally, as research activities ramped up, FSIL highlighted project progress through Agrilinks, e-newsletters, social media, and a webinar.

## Research Program Overview and Structure

In 2019, USAID selected Purdue University, in partnership with Cornell University, to lead the first-ever Feed the Future Innovation Lab for Food Safety. FSIL's vision is to strengthen food security for developing nations through research and capacity development that increases the production of, and access to, safe and nutritious food. FSIL aims to generate and facilitate the dissemination of knowledge, practices, and technologies that improve and enhance climate-resilient food safety systems for communities, households, and commercial value chains.

### Alignment with the Global Food Security Strategy

Food safety intersects with three objectives of the U.S. Government Global Food Security Strategy FY2022-2026 (nutrition, resiliency, and economic growth), as it is necessary for food security. Therefore, there is a clear need to consider food safety challenges and opportunities when conducting and translating research designed within the strategy. FSIL's research portfolio is framed by three Areas of Inquiry (AoI), which closely align with the GFSS objectives.

- AoI 1 - Improved Nutrition and Human Outcomes: Research under this AoI focuses on the consumption of safe and affordable food as a means of reducing undernutrition. The AoI emphasizes that nutritious foods can still result in illness or disease in the event they are unsafe due to contamination with biological or chemical hazards.
- AoI 2 - Reduce and Mitigate Risk for Enhanced Resilience: Research under this AoI focuses on food safety behavior, practices, and awareness that are closely tied to a population's resilience. One of the overarching aims of resiliency is to reduce the human and economic costs of recurrent crises, which are exemplified in endemic diarrheal diseases caused by contaminated food and water.
- AoI 3 - Advancing the Productivity Frontier through Economic Development: Research under this AoI focuses on developing opportunities for foods and commodities to reach new local and export market opportunities. Developing and implementing advanced food safety regulations and monitoring systems will ensure products meet the international food safety standards required for entry into global trade.

### Overview and Objectives

To enhance food safety globally, FSIL pursues the following objectives:

- Increasing awareness of food safety
- Enhancing capacity to conduct food safety research
- Developing policies that enable conditions for food safety research, translation, and practice
- Accelerating translational research technologies and practices for households, communities, and the food industry

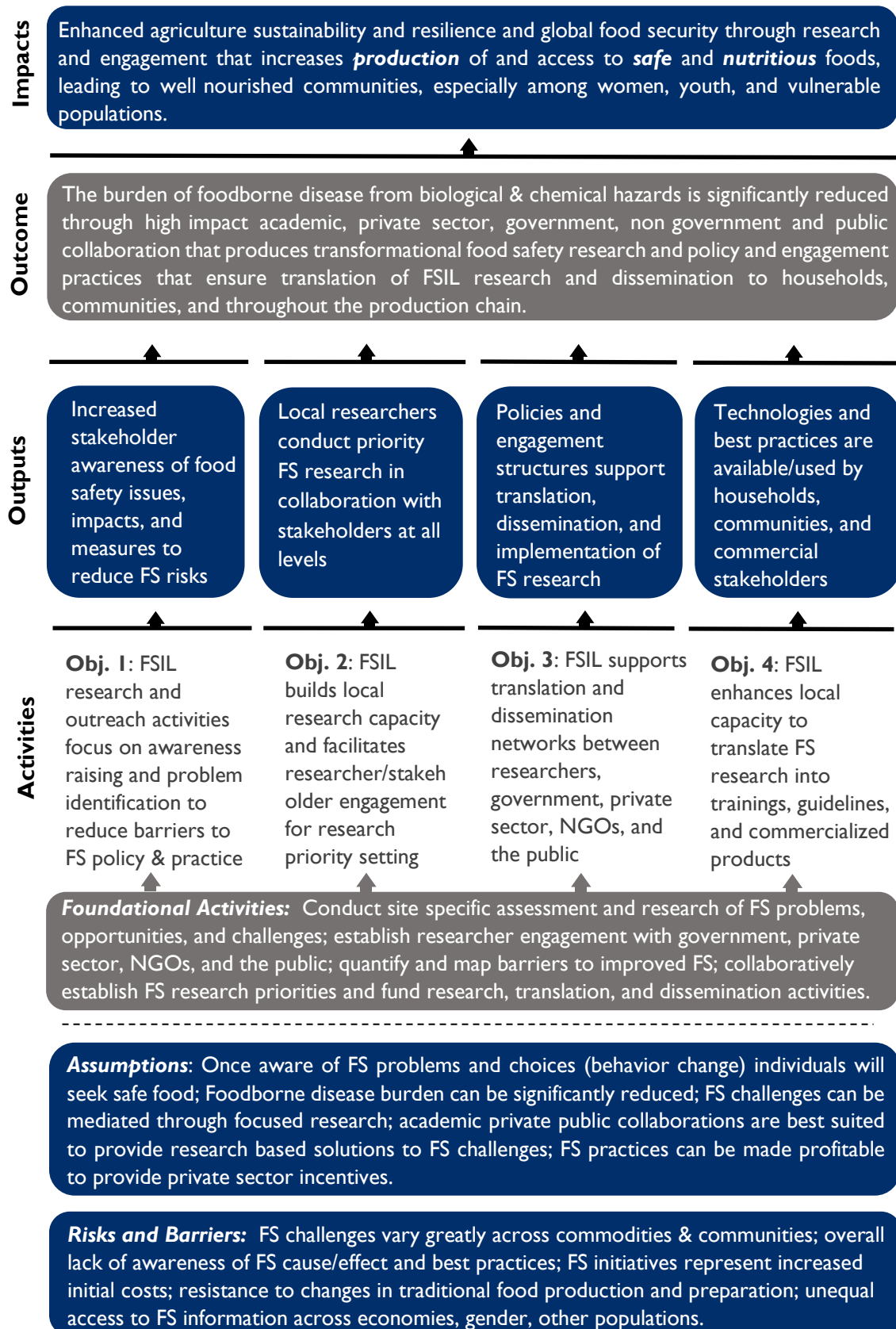
### Research Portfolio Design

In FY2021, FSIL funded four new competitively awarded long-term subawards in Bangladesh, Cambodia, Kenya, and Senegal that built on the findings of FSIL's foundational research grants (QuickStarts). FSIL released its second RFA in April 2021, focusing on Minority Serving Institution (MSI)-led partnerships for global food safety research to complement the technical scope of active long-term subawards. The final selection and administration of subawards for two newly funded projects in Nepal and Nigeria occurred in FY2022.

### Cross-Cutting Themes

Across the FSIL research portfolio, the cross-cutting themes addressed include gender equity, youth engagement, human and institutional capacity development, and food safety enabling environments.

## Theory of Change (TOC) and Impact Pathway



## Focus Country Key Accomplishments

### Bangladesh

In FY2022, the FSIL long-term subaward in Bangladesh made progress toward its goal of identifying areas in value chains where strategic actions can enhance food safety in fish and select frozen chicken products. The project team held a sensitization workshop in July designed to raise awareness of the project's activities and solicit feedback. The event featured chief guest Dr. Shamsul Alam, State Minister of the Ministry of Planning, and it hosted 170 individuals representing the government, private sector, civil society, and producers. Researchers subsequently held three experimental auctions that engaged 135 consumers to assess their willingness to pay for safer fish products. Initial results indicate that consumers are willing to pay 35-39% more for tilapia and pangasius fish produced in ponds that used safer feeds and followed best management practices. Eight graduate students, including two Ph.D. and six M.S. students, also received support from the project.

FSIL's research aligns with the GFSS Bangladesh Country Plan<sup>1</sup> and particularly its component of Food Safety and Sanitary and Phytosanitary Standards. The Bangladesh subaward is generating food safety economics data that supports the development of food safety policy and the ongoing activities of the Bangladesh Food Safety Authority. Graduate students are also being trained by the project, enhancing local capacity to conduct research and monitoring of food safety issues.

### Cambodia

FSIL's long-term subaward in Cambodia continued to target food safety gaps in the production, distribution, and sale of vegetables in Cambodia to reduce their risk of contamination with bacterial pathogens. Many FY2022 activities focused on data collection for key studies, including a longitudinal study measuring *Salmonella* and *E. coli* contamination of vegetables, a gender analysis of women vegetable producers, and a study examining how behavior theory has been applied to past development interventions in Cambodia. The project reached 119 individuals through virtual and in-person short-term training, with topics including laboratory methods, qualitative research methods, and leadership development. Three M.S. graduate students were also supported by the project in FY2022.

FSIL's research contributes to multiple Intermediate Results (IRs) and Sub-IRs within the Cambodia Country Development Cooperation Strategy<sup>2</sup>, including Sub-IR 1.1.3: Strengthened capacity in science, technology, and innovation for women and youth. The project is strengthening both microbiology and social science food safety research capacity in Cambodia while identifying and developing interventions to control high-risk bacterial pathogens in vegetable production, distribution, and sale.

### Kenya

In FY2022, the FSIL long-term subaward in Kenya maintained a systems-based, risk-informed approach to improve food safety in poultry. Using the FAO Guide to Ranking Food Safety Risks at the National Level<sup>3</sup>, project collaborators hosted a risk ranking workshop with 31 total participants to prioritize potential risk management interventions. A post-harvest carcass wash intervention was selected for the evaluation study based on workshop outcomes. Researchers also developed protocols and submitted IRB applications for multiple studies, including a gender analysis, microbiological baseline survey, and quantitative microbial risk assessment. Two M.S. students and one Ph.D. student received support from the project and engaged in research activities in FY2022.

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<sup>1</sup> <https://www.usaid.gov/documents/1867/global-food-security-strategy-gfss-bangladesh-country-plan>

<sup>2</sup> [https://www.usaid.gov/sites/default/files/documents/Cambodia\\_CDSC\\_External\\_2025.pdf](https://www.usaid.gov/sites/default/files/documents/Cambodia_CDSC_External_2025.pdf)

<sup>3</sup> <https://www.fao.org/documents/card/en/c/cb0887en/>

FSIL's current emphasis on food safety in the poultry value chain aligns with the GFSS Kenya Country Plan<sup>4</sup> and its inclusion of poultry as a Tier 2 commodity. The FSIL subaward in Kenya partners with women and youth poultry farmers through the identification and testing of food safety interventions.

## Senegal

FSIL's long-term subaward in Senegal continued efforts to strengthen food safety capacity in Senegal's growing dairy sector for a resilient, safe dairy industry, reduced foodborne disease, and improved market access in FY2022. Research priorities were developed by project collaborators and used to inform studies that are being implemented by five M.S. students receiving support from the project. The project team engaged 152 total value chain actors in three sensitization workshops that aimed to raise awareness of food safety issues and gain further insights into challenges faced by mini-dairies and dairy cooperatives. An interactive workshop designed to increase knowledge and understanding of gender dynamics and influences in agricultural food systems also engaged 44 individuals from the private sector, government, and civil society.

FSIL's ongoing research aligns with the GFSS Senegal Country Plan<sup>5</sup> and its aim to develop a functional food safety regulatory system based on sound science and international standards. The project is raising awareness of food safety issues and their impact on public health, conducting research-based food safety training programs, identifying practical food safety interventions, and coordinating comprehensive food safety regulations aligned with government policies

## Nepal

Consumption of fresh produce contributes to dietary diversity and well-nourished individuals, households, and communities. However, when vegetables are consumed raw, prior contamination with organisms that cause foodborne illness can undermine their contributions to reaching nutritional targets. In FY2022, FSIL initiated a two-year research project that addresses these issues by identifying the factors which will drive the supply of and demand for safer salad vegetables.

Initial accomplishments of FSIL's short-term subaward in Nepal, which began in March 2022, included the design of a consumer survey questionnaire and its corresponding sampling strategy. IRB approvals for this activity were obtained, and data collection occurred in late FY2022. The capacity of Nepalese partners SAHAVAGI and Agriculture and Forestry University to conduct ethical human subject research was strengthened, as both institutions developed IRB committees with project support. The project also reached 60 individuals through short-term trainings, with topics including laboratory methods, qualitative research protocols, and food safety economics.

FSIL's research supports the GFSS Nepal Country Plan<sup>6</sup> and its focus on improving access to and use of diverse, safe, and nutritious foods. By equipping entrepreneurs and policy makers with guidance for market-led, demand-driven food safety practices and labeling recommendations for fresh produce, informed by analysis of consumer behavior, the project aims to stimulate a rapid increase in access to nutritious produce in Nepal.

## Nigeria

Household-level food safety is a significant economic and public health concern in Nigeria, which has a childhood stunting rate of 33%. Exposure to foodborne illness through inappropriate food storage, cross-contamination, and infected food handlers contributes to a vicious cycle of illness and malnutrition and impacts the development and nutritional status of young children. In FY2022, FSIL initiated a two-year research project

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<sup>4</sup> <https://www.usaid.gov/documents/1867/global-food-security-strategy-gfss-kenya-country-plan>

<sup>5</sup> <https://www.usaid.gov/documents/1867/global-food-security-strategy-gfss-senegal-country-plan>

<sup>6</sup> <https://www.usaid.gov/sites/default/files/documents/1867/GFSS-Nepal-Country-Plan.pdf>

to address these challenges by identifying facilitators of and barriers to reducing the prevalence of foodborne disease in Nigerian households with young children.

Since its May 2022 launch, the initial accomplishments of FSIL's short-term subaward in Nigeria included the development of protocols and sampling plans for a household survey, anthropometric assessment, and environmental sanitation assessment. Researchers submitted IRB applications and hired a project manager in Nigeria to coordinate future activities. Project leaders were also invited to present the project at a regional meeting of the Nigerian Institute of Food Science and Technology as well as a food safety month webinar hosted by Agrilinks.

FSIL research aligns with the GFSS Nigeria Country Plan's<sup>7</sup> Component C: Improving Access to and Use of Diverse, Safe, Nutritious, and High-Quality Foods. By understanding the most common food safety risks in households, levels of childhood stunting, the challenges faced by mothers in providing safe and nutritious foods for their children, and the critical policy needs to support the implementation of Nigeria's national food safety plan, the project will prioritize programs and policy actions to improve household food safety.

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<sup>7</sup> [https://www.usaid.gov/sites/default/files/documents/1867/Nigeria\\_GFSS\\_Country\\_Plan\\_-\\_Final\\_WS\\_Edits\\_2.pdf](https://www.usaid.gov/sites/default/files/documents/1867/Nigeria_GFSS_Country_Plan_-_Final_WS_Edits_2.pdf)



## Research Project Reports

### Enhancing Food Safety in Fish and Chicken Value Chains of Bangladesh (Bangladesh Long-Term Subaward)

**Location:** Bangladesh; Districts: Mymensingh, Bogura, Dhaka, Gazipur, Jashore, Khulna, Patuakhali, and Rajshahi

**Description:** The project is promoting informed decisions and actions to enhance the food safety of farmed fish and frozen uncooked chicken products. By identifying areas along the value chain that need improvement and developing tools to quantify the benefits of improved food safety, the project is fostering an enabling environment to support consumers' access to safe, nutritious food products.

**Theory of Change and Impact Pathway(s):** This project contributes toward Objectives 1-4 of the FSIL TOC.

**Collaborators:** Texas State University (U.S.), University of Dhaka (Bangladesh), Bangladesh Agricultural University (BAU; Bangladesh)

**Achievements (Aligned with Bangladesh WP Activity 1.1):** Three targeted fish species (rohu, tilapia, and pangasius) were cultured in three ponds in the Mymensingh district following best management practices recommended by the Bangladesh Fisheries Research Institute (BFRI) to compare the levels of microbial contaminants, antibiotic residues, and heavy metals in fish grown in these trial ponds and other control ponds. Safer fish feed without any growth additives, which are often present in commercial feeds, was prepared by a private feed company following a scientific and safe feed formula recommended by BFRI. The feed was tested by the Animal Nutrition Lab of BAU and used in the trial ponds. Physical samples of fish were collected from the trial ponds and other surrounding (control) ponds at the same value chain node (pond bank) for relative food hazard evaluation, specifically for microbial contaminants, antibiotic residues, and heavy metals in the intestine, gill, and flesh. Initial microbiological tests showed that tilapia and pangasius samples from safer ponds have lesser total viable bacteria count, total *Salmonella* count, and total coliform count than samples from control ponds. Tests for heavy metals and antibiotic residues are in progress. Laboratory results obtained for tilapia and pangasius were used to design experimental auctions to estimate consumers' willingness to pay for safer fish products. Three auctions were conducted in Mymensingh, Patuakhali, and Narayanganj with 135 total fish consumers. On average, consumers were willing to pay a 35-39% higher price for safer tilapia and pangasius fish produced in ponds that used safer feeds and followed best management practices. This work complements studies conducted by the Feed the Future Fish Innovation Lab, which is investigating pathogen prevalence in similar species. This study complements their work in that it looks at consumer's willingness to pay for safer fish and associated production costs. Prior to the auctions, a project sensitization workshop was held in Dhaka in July 2022 with 170 individuals in attendance representing the government, private sector, producers, and civil society. The purpose of the workshop was to familiarize attendees with the project and food safety concepts and gain feedback to shape future research priorities.

**Capacity Building:** Two project-supported Ph.D. students have been enrolled in their degree programs and are studying agricultural economics and microbiology, respectively. An initial cohort of four M.S. students conducting their thesis research in collaboration with the project have submitted their theses, and one of these students has graduated. The second cohort of four M.S. students has been recruited.

**Lessons Learned and Broader Application:** At the sensitization workshop, producers voiced interest in a detailed cost-benefit analysis of producing safer fish. They emphasized the high cost of fish feed, an obstacle to remaining engaged in fish farming. The project team is working to adjust their future research plans to consider a cost-benefit analysis of producing safer feed through collaboration with manufacturers to deliver on

the producers' desire for evidence-based decision-making. Willingness to pay studies in food safety, such as those pioneered in this project, identify and prioritize consumer food safety demands and inform private sector intervention strategies; this approach should be considered for a wide range of nutrient dense, short shelf-life foods that are inherently higher risk of resulting in foodborne disease.

***Publications and Presentations:***

None to report in FY2022.

## **Reducing Foodborne Pathogen Contamination of Vegetables in Cambodia: Innovative Research, Targeted Interventions, and Impactful, Cambodian-Led Engagement (Cambodia Long-Term Subaward)**

**Location:** Cambodia; Siem Reap and Battambang provinces, Phnom Penh municipality

**Description:** The goal of the project is to safeguard the nutritional gains of a healthy diet for Cambodian children, households, and communities by strengthening food safety across the vegetable value chain. Project partners are bridging existing food safety gaps and solidifying shared food safety agendas across universities and the public and private sectors. Together, they are testing and implementing data-driven strategies to measurably reduce the incidence of foodborne pathogen contamination of vegetables consumed in Cambodia.

**Theory of Change and Impact Pathway(s):** This project contributes toward Objectives 1-4 of the FSIL TOC.

**Collaborators:** Kansas State University (U.S.), Purdue University (U.S.), Penn State University (U.S.), Royal University of Agriculture (RUA; Cambodia), Center of Excellence on Sustainable Agricultural Intensification and Nutrition (CE SAIN; Cambodia), Institute of Technology Cambodia (ITC; Cambodia), Institut Pasteur du Cambodge (IPC; Cambodia), World Vegetable Center (Cambodia)

**Achievements (Aligned with Cambodia WP Activity 1.1):** For the longitudinal study measuring *Salmonella* and *E. coli* contamination of vegetables, five sample collection trips were completed in Battambang and Siem Reap between April and August 2022. Samples were collected from farms, distribution centers, and markets and transported to Phnom Penh for microbial analysis. In June and July 2022, 22 in-person interviews were conducted with women vegetable producers for the gender analysis. Students from the Qualitative Research Methods course participated as enumerators and assisted in translating results. Researchers also completed interviews with implementers of international programs in Cambodia aimed at identifying how behavior theory has been integrated into previous interventions in rural Cambodian communities. These data will allow the project to identify potential barriers to the adoption of food safety practices in targeted audiences as well as means to overcome such barriers.

**Capacity Building:** In early FY2022, Kansas State University hosted a virtual lab methods training for 21 students and staff at RUA, ITC, and IPC. The training prepared personnel to implement the longitudinal study, and it familiarized trainees with traditional detection methods for *Salmonella* and *E. coli* as well as an overview of PCR methods for confirmation of bacterial pathogens. In mid-FY2022, 48 individuals completed a virtual Qualitative Research Methods course led by Purdue University, which equipped participants to support the project's gender analysis. Kansas State University and CE SAIN collaborated to develop and implement a Women's Leadership Program (WLP). Utilizing a train-the-trainer approach, the WLP empowered university students to collaborate with female vegetable value chain actors through interactive workshops that encouraged self-discovery, enhanced food safety awareness, and cultivated collective action.

**Lessons Learned and Broader Application:** Due to the realization that many farms only grow one type of vegetable, the researchers extended the longitudinal study timeline to ensure they maintained the power of the study. The team also continues to adapt to changes in production practices, seasonal and weather impacts, and farmer decision-making. For example, tomatoes were dropped from the study at the farm level since no farms were growing tomatoes during the initial sampling periods. The food systems research approach in this project serves as a high impact framework for future studies seeking to strengthen food systems by addressing fundamental food safety risks in nutritious foods. Multidimensional data from this study identifies drivers and informs future investment levers towards development outcomes as defined in the RFS Food Systems Conceptual Framework.

***Publications and Presentations:***

Molitor, A., Schwan, C. L., Hok, L., Ebner, P. D., Vipham, J., & Trinetta, V. (2022). Quantitative and qualitative assessments of Enterobacteriaceae, Coliforms and generic *Escherichia coli* on fresh vegetables sold in Cambodian Fresh Produce Distribution Centers(pp.107-112). *Journal of Food Protection Trends*, 42(2), Online. doi:10.4315/FPT-21-023.

## **Chakula Salama: A Risk-based Approach to Reducing Foodborne Disease and Increasing Production of Safe Foods in Kenya (Kenya Long-Term Subaward)**

**Location:** Kenya; Kiambu County

**Description:** The overarching goal of Chakula Salama – which means “safe food” in Swahili – is to improve food security and nutrition in Kenya. Project leaders are developing the country’s capacity for systems-based, risk-informed approaches to food safety which can reduce the risk of foodborne disease, increase the production of safe food, and improve economic outcomes. To demonstrate this approach, they are focusing on small-scale poultry production by women and youth in peri-urban areas of Kenya.

**Theory of Change and Impact Pathway(s):** This project contributes toward Objectives 1-4 of the FSIL TOC.

**Collaborators:** The Ohio State University (U.S.), University of Florida (U.S.), Kenya Medical Research Institute (KEMRI; Kenya), University of Nairobi (Kenya)

**Achievements (Aligned with Kenya WP Activity 1.1):** Project researchers worked in collaboration with stakeholders to identify food safety priorities in the poultry value chain by conducting a scoping workshop in late FY2021 to define the scope and purpose of the risk ranking. After collecting and analyzing data on identified hazards and intervention strategies, they conducted a risk ranking workshop in March 2022 to prioritize potential risk management interventions. The team selected a post-harvest carcass wash intervention based on the workshop outcomes. Next, they developed a study protocol for the baseline assessment of the evaluation study and submitted IRB applications. To estimate the public health impact as well as the benefits and costs of the intervention, researchers developed a statement of purpose and constructed a conceptual framework for the quantitative microbial risk assessment that will be used to estimate the impact of the selected intervention. The research team also made progress on the gender analysis by submitting IRB applications to The Ohio State University (OSU), the University of Florida, and the University of Nairobi as well as a manuscript on gender perspectives in smallholder poultry value chains in Kenya. To inform predicted *Salmonella* and *Campylobacter* contamination, researchers conducted a literature review on the prevalence of these pathogens in poultry in Kenya and drafted a manuscript. They also developed a study protocol for the microbiological baseline survey and submitted IRB applications to OSU and KEMRI.

**Capacity Building:** Eight graduate students participated in the risk prioritization workshop and interacted with poultry producers, academic and local government experts, and industry experts in the small group exercises. Exposure to the risk ranking exercise and observing the process was a new experience for many of the students. The project’s graduate student networking group also continued in FY2022. Eight students involved in the project (3 from the University of Nairobi, 4 from KEMRI, and 1 from OSU) attended monthly meetings with topics that included project updates and sharing interesting findings, such as the IRB process, use of Zotero, and more. In July, OSU, the University of Nairobi, and KEMRI held a two-day meeting where students from all three institutions presented their work. The activity was a way for students to practice their presentation skills and gain feedback on their research.

**Lessons Learned and Broader Application:** Utilizing reflections from the risk prioritization workshop, the team identified opportunities to improve implementation if conducting a similar activity in the future. Key recommendations include providing information about interventions to participants in advance of the event, offering a glossary of technical terms for participants to reference during the exercise, and utilizing a specific template for all note-taking to ensure critical information is consistently captured. The risk-ranking approach used in this study is scalable, from whole-country analysis to a specific value chain in a one location. The community and science-based approach holds promise for bolstering food system resilience as well as rapid deployment in response to a crisis that disrupts food system stability, such as war, climate change, natural disasters, or future pandemics. Potential applications include whole country or regional risk ranking, value chain-level assessment, key food system infrastructure (e.g., traditional market) assessment, and capacity strengthening through trainings in how to do risk ranking.

***Publications and Presentations:***

Kowalcyk, B. & Colverson, K. (2022) Chakula Salama: First Steps towards Implementing a Risk-based Food Safety System for Small-holder Poultry. *KEMRI lecture*. Nairobi, Kenya.

Kowalcyk, B. & Colverson, K. (2022) Chakula Salama: First Steps towards Implementing a Risk-based Food Safety System for Small-holder Poultry.) *University of Nairobi lecture*. Nairobi, Kenya.

## **Food Safety Capacity Building in Senegal: Enhancing Resilience of the Dairy Value Chain by Leveraging Public-Private Partnerships (Senegal Long-Term Subaward)**

**Location:** Senegal; Louga, Matam, and Saint Louis regions

**Description:** The goal of the project is to transform the overall safety of dairy and dairy products produced in Senegal, which will improve the nutritional status and economic prospects for the women and youth who play critical roles in dairy production. Project partners are advancing data-driven safety practices, policies, and training to support the development of well-equipped food safety professionals in Senegal.

**Theory of Change and Impact Pathway(s):** This project contributes toward Objectives 1-4 of the FSIL TOC.

**Collaborators:** University of Georgia (U.S.), Tuskegee University (U.S.), Institut de Technologie Alimentaire (ITA; Senegal), Institut Sénégalais de Recherches Agricoles (ISRA; Senegal), Conseil National du Développement de la Nutrition (CNDN; Senegal)

**Achievements (Aligned with Senegal WP Activity 1.1):** Project collaborators identified priority areas for future research and interventions, including: cold chain and local certification issues as they relate to food safety, hygiene and sanitation issues in milking facilities, microbial spoilage during storage and the lack of timely pasteurization capabilities, the definition of mini-dairies, and opportunities to better integrate food safety as well as gender and youth into existing policies related to dairy. Five Senegalese graduate students were recruited to participate in the project and began research focused on these priority areas. Surveys for field research have been developed, reviewed, and are being implemented by the graduate students. Human subjects research plans for conducting surveys were accepted by the Senegalese Ethics Board, and the IRB submission is in process at the University of Georgia. Three sensitization workshops were held in Louga, Matam, and Saint Louis to raise awareness of food safety issues and gain further insights into challenges faced by mini-dairies and dairy cooperatives. Workshop assessment data was collected and is being analyzed to determine the outcomes of the workshops. Two manuscripts focused on food safety challenges in milk production and processing were completed and submitted, and a third manuscript on the role of women and youth in the dairy value chain has been drafted. Major findings include a considerable lack of awareness of the risks posed by unpasteurized dairy products and there is limited data available on the safety of dairy products. There is a need to educate milk producers, small-scale processors, and vendors on the importance of immediately refrigerating milk and maintaining cold chain until heat treatment and sale to the consumer. There are notable barriers to this, however, such as obtaining and maintaining equipment necessary for cold storage and building consumer demand for safe milk and dairy products.

The project team also developed partnerships with the Institut Supérieur D'Enseignement Professionnel (ISEP) and Centre d'Etudes, de Recherche et de Formation en Langues Africaine (CERFLA) to align FSIL activities with other relevant projects being conducted in Senegal and to strengthen the impact of future outreach.

**Capacity Building:** As U.S.-based collaborators traveled to Senegal, an emphasis was placed on graduate student development and support. During one trip, training was conducted on developing presentations with a focus on research objectives, methodology, and results/outcomes. A graduate student project exchange meeting was organized at ITA to review the project's progress and develop a survey tool for field research. The project's gender specialist also conducted a gender sensitization workshop in Dakar for actors in the dairy value chain.

***Lessons Learned and Broader Application:*** Through their experience conducting sensitization workshops, the project team developed practical tactics to improve future outreach activities that consider varied literacy, local languages, and the schedules of local government officials. Dairy products are an important part of the food system as they are economically important, nutrient dense foods that present an inherently high risk of foodborne disease transmission and can have short shelf-lives if not properly processed and stored. This project is a multidimensional case study leveraging the RFS Food Systems Conceptual Framework, where drivers, investment levers, and the state of the food supply and enabling environment are being investigated to ensure safer foods.

***Publications and Presentations:***

Singh, M., Ndiaye, C., & Thippareddi, H. (2022). FSIL Project - USAID Chaine de Valeur Lait. *Project informational flyer*. Senegal.



## **Market-Led Food Safety in Nepal: Harnessing Production Incentives and Consumer Awareness (Nepal Short-Term Subaward)**

**Location:** Nepal; Morang, Sarlahi, Kaski, Chitwan, Makawanpur, Kathmandu, Kalikot, Surkhet, Palpa, Banke, Rupandehi

**Description:** The goal of the project is to stimulate a rapid increase in access to nutritious produce in Nepal by identifying the factors which will drive the supply of and demand for safer salad vegetables. Researchers are assessing indicators of current food safety risks, understanding the food safety behaviors of vegetable producers and consumers, and identifying incentives that could transform food safety policies and practices. The work will enable entrepreneurs and policy makers to reach informed decisions on prioritizing food safety investments and support the awareness of safer food consumption and dietary diversity in Nepali households.

**Theory of Change and Impact Pathway(s):** This project contributes towards Objectives 1-4 of the FSIL TOC.

**Collaborators:** Tennessee State University (U.S.), Arizona State University (U.S.), SAHAVAGI (Nepal), Agriculture and Forestry University (Nepal)

**Achievements (Aligned with Nepal WP Activity 1.1):** Soon after project initiation, researchers designed a consumer survey questionnaire and consumer's willingness to pay (WTP) assessment methodology. Institutional Review Board (IRB) approvals of the research protocols were obtained from relevant institutions. In consultation with project partners, a survey sampling strategy was finalized to adequately represent Nepali consumers. Project partners trained enumerators for the survey and WTP experiment. After receiving training, the survey was administered among selected consumer households in five metropolitan areas of Nepal: Kathmandu Valley, Bharatpur (Chitwan), Hetauda (Makwanpur), Butwal (Rupandehi), and Pokhara (Kaski). From a subset of consumer households, research technicians collected water samples and tested for the presence of *E. coli*. Utilizing the completed consumer household survey responses, researchers began undertaking data compilation, coding, and entry to prepare for analysis.

**Capacity Building:** The project has strengthened the capacity of SAHAVAGI and Agriculture and Forestry University (AFU) to conduct research projects that include social and behavioral studies. Both institutions received support and guidance that led to the establishment of Institutional Review Board (IRB) committees. AFU also established a formal Institutional Biosafety Committee to review projects that require the control of biohazards. The process of forming these research structures has enhanced the institutional cultures and elevated the importance of research protocol design, ethical approval, and meticulous data collection.

A lecture was provided to Agriculture and Forestry University students to provide background on food safety issues and to teach economic and social research methodologies. Additional short-term capacity strengthening events included trainings in survey data collection and water sample collection and analysis.

**Lessons Learned and Broader Application:** While the research team developed a strategic and specific consumer household sampling plan, flexibility and coordination were needed to implement it. Identifying a local government office was valuable in preparing the sample frame and household list. Leveraging a communication mobile app to share photos and locations also facilitated coordination among enumerators, field supervisors, and local guides. Willingness to pay studies in food safety, such as those pioneered in this project, identify and prioritize consumer food safety demands and inform private sector intervention strategies; this approach should be considered for a wide range of nutrient dense, short shelf-life foods that are inherently higher risk of resulting in foodborne disease.

***Publications and Presentations:***

Khanal, A. (2022). Food safety issues in Nepal and choice experiment of food safety attributes. *Agriculture and Forestry University*. Nepal.

## **Strengthening Household and Community Food Safety in Nigeria (Nigeria Short-Term Subaward)**

**Location:** Nigeria; Ibadan

**Description:** The project is identifying facilitators of and barriers to reducing the prevalence of foodborne disease in Nigerian households with young children. Using a community-based approach that harnesses the perspectives of youth, mothers, primary health care providers, community development personnel, government representatives, civil society leaders, and community-based organizations, researchers are collaboratively identifying strategic, feasible activities to mitigate and prevent household foodborne illnesses.

**Theory of Change and Impact Pathway(s):** This project contributes towards Objectives 1-4 of the FSIL TOC.

**Collaborators:** University of Alaska Fairbanks (U.S.), Utah State University (U.S.), University of Connecticut (U.S.), Bowen University (Nigeria), Obafemi Awolowo University (Nigeria), University of Ibadan (Nigeria)

**Achievements (Aligned with Nigeria WP Activity 1.1):** The research team spent their first four months laying the groundwork to successfully complete the project and begin data collection in October 2022. In August, they hired a project manager in Nigeria who holds a Master's degree in Health Promotion and Education and brings to the team substantial experience preparing and overseeing field work. Researchers finalized their sampling plan for the household survey, anthropometric assessment, and environmental sanitation assessment, which included obtaining permission from the Local Immunization Officers to access their registers. The household survey was finalized and translated into Yoruba. The protocol for the household survey and child anthropometric assessment is under review by the IRB. The team also drafted a training manual that will be used to train 20 enumerators who will collect data in the field. Finally, researchers were invited to provide presentations to introduce the project at the regional conference of the Nigerian Institute of Food Science and Technology and a webinar hosted by Agrilinks in recognition of food safety month.

**Capacity Building:** The project has not yet completed substantial capacity building activities.

**Lessons Learned and Broader Application:** Administrative challenges outlined in the Issues section impacted the project's launch and early activities. As observed with multiple local partners, there are significant barriers to maintaining an active SAM registration. A regular observation has been that the former Entity Administrator for SAM.gov is not a central university administrator (as is common in U.S. universities) but a researcher that previously received funding from the U.S. government. The Entity Administrator may not routinely renew the SAM registration if they are not actively receiving U.S. government funds as an individual. Households and communities are the target audiences that must be reached to increase foodborne disease awareness, adopt practical approaches to in-home food safety, and to subsequently create demand for safer foods. The approach developed in this project can be scaled to gain insight into awareness and behavior change barriers in other geographies and food systems.

### **Publications and Presentations:**

Bersamin, A. & Atoloye, A. (2022) Increasing Food Security Through Safe, Nutritious Diets. *Agrilinks Webinar*. Virtual.

Samuel, F. (2022) Introduction to FSIL project: Household-level food safety risk and community capacity to monitor and mitigate foodborne illness in Nigeria. *Nigerian Institute of Food Science and Technology*. Ibadan, Nigeria.

## Human and Institutional Capacity Development

### Short-term training

Country of Training	Brief Purpose of Training	Who was Trained	M	F	Total
Cambodia (virtual)	Participants completed Collaborative Institutional Training Initiative (CITI) training and were introduced to qualitative research methods using gender analysis research as a platform.	Civil society	30	18	48
Cambodia (virtual)	Participants were trained in the sample collection process and logistics of the longitudinal study.	Civil society	5	0	5
Cambodia (virtual)	Participants were trained in laboratory techniques to identify and isolate <i>Salmonella enterica</i> and <i>Escherichia coli</i> from vegetable and environmental samples.	Civil society	9	12	21
Cambodia (virtual)	Participants were trained in leadership, strengths and confidence-building, community engagement, and collective action to improve food safety practices.	Civil society	6	12	18
Cambodia	Women's Leadership Workshops were designed to build confidence, expand leadership capabilities, and enhance a sense of belonging in the respective communities.	Civil society, Producers	0	27	27
Kenya	Risk prioritization workshop for interventions in the poultry value chain. Participants received training on food safety issues and interventions.	Government, Private sector, Civil society	12	18	30
Nepal (virtual)	Participants completed Collaborative Institutional Training Initiative (CITI) training.	Civil society	2	0	2
Nepal	Participants were trained in data collection, interviewing, and scientific methods of sampling in social sciences.	Civil society	6	3	9
Nepal	Participants were trained in laboratory techniques to identify pathogens in water samples.	Civil society	3	1	4
Nepal	Training lecture to provide background on food safety issues in Nepal and to teach methodologies in economic and social data collection.	Civil society	36	11	47

Senegal	Interactive workshop designed to increase knowledge and understanding of the gender dynamics and influences in agricultural food systems.	Government, Private sector, Civil society	8	36	44
Senegal	Participants learned about food safety and the role of gender and youth in the dairy value chain in Louga, Matam, and Saint Louis.	Private sector, Producers, Civil society	68	84	152
<b>Total</b>			<b>185</b>	<b>222</b>	<b>407</b>

## Long-term training

Trainee Number	Sex	University	Degree	Major	Program End Date (M/Y)	Degree Granted (Y/N)	Home Country
1*	F	Purdue University	Ph.D.	Agricultural Sciences Education and Communication	May 2023	N	United States
2*	M	Purdue University	Ph.D.	Agriculture Economics	May 2023	N	United States
3	M	Cornell University	Ph.D.	Food Science and Technology	May 2024	N	United States
4	F	Royal University of Agriculture	M.S.	Agro Industry (Food Microbiology)	June 2023	N	Cambodia
5	F	Royal University of Agriculture	M.S.	Agro Industry (Food Microbiology)	June 2023	N	Cambodia
6	F	Purdue University	M.S.	Animal Science	December 2022	N	U.S.
7	M	Purdue University	Ph.D.	Agricultural Sciences Education and Communication	June 2024	N	U.S.
8	F	Bangladesh Agricultural University	M.S.	Agricultural Economics	October 2022	N	Bangladesh
9	F	Bangladesh Agricultural University	M.S.	Food Technology and Rural Industries	October 2022	N	Bangladesh
10	F	Bangladesh Agricultural University	M.S.	Agricultural Finance and Banking	June 2022	Y	Bangladesh
11	F	Bangladesh Agricultural University	M.S.	Microbiology and Hygiene	October 2022	N	Bangladesh
12	M	Bangladesh Agricultural University	Ph.D.	Agricultural Economics	October 2024	N	Bangladesh
13	F	National School of Agriculture (ENSA)	M.S.	Animal Production	December 2022	N	Senegal
14	M	National School of Agriculture (ENSA)	M.S.	Value Chain Development, Agriculture & Agribusiness Entrepreneurship	December 2022	N	Senegal
15	F	Polytechnic School of Dakar	M.S.	Engineering in the Food Industry	December 2022	N	Senegal
16	M	National School of agriculture (ENSA)	M.S.	Value Chain Development, Agriculture & Agribusiness Entrepreneurship	December 2022	N	Senegal
17	F	National School of agriculture (ENSA)	M.S.	Value Chain Development, Agriculture & Agribusiness Entrepreneurship	December 2022	N	Senegal
18	F	Institute of Technology of Cambodia (ITC)	M.S.	Agri-Industrial Engineering	September 2023	N	Cambodia
19	F	KEMRI	M.S.	Medical Microbiology	December 2023	N	Kenya

20	M	KEMRI	M.S.	Medical Microbiology	December 2022	N	Kenya
21	F	Purdue University	Ph.D.	Agricultural Economics	August 2026	N	Senegal
22	F	Bangladesh Agricultural University	Ph.D.	Microbiology	May 2024	N	Bangladesh
23	F	Bangladesh Agricultural University	M.S	Food Science	March 2023	N	Bangladesh
24	F	Bangladesh Agricultural University	M.S	Agricultural Economics	March 2023	N	Bangladesh
25	F	Bangladesh Agricultural University	M.S	Microbiology	March 2023	N	Bangladesh
26	F	Bangladesh Agricultural University	M.S	Agricultural Economics	September 2023	N	Bangladesh
27	M	University of Nairobi	Ph.D.	Food Safety and Quality	September 2023	N	Kenya

\*Supported by FSIL for the fall 2020 semester.

## Environmental Mitigation and Monitoring Plan (EMMP)

Per the FSIL EMMP, activities requiring specific mitigation and monitoring efforts include 1) food safety research on raw food materials contaminated with biological and chemical contaminants; and 2) clinical (medical) evaluations and people-based surveys. During FY2022, FSIL continued to mitigate risks associated with these activities.

Each subaward's PI is responsible for uploading the required IRB and IBC documentation to the Piestar DPx platform for review by FSIL's Director and Associate Director. Once the documentation is approved by FSIL, it is submitted to the AOR for review. In addition, FSIL conducts an internal EMMP audit semiannually to ensure all required documentation has been submitted per each subaward's activities.

For laboratory-based research, each subaward PI is responsible for documenting laboratory protocols, training personnel, and conducting regular on-site or virtual monitoring of laboratory sites to ensure safety protocols are followed.

Subaward	IBC approval	Laboratory Standard Operating Procedures	Lab Safety Training Forms	Lab Safety Monitoring Forms
Bangladesh long-term	Submitted to AOR	Submitted to AOR	Submitted to AOR	Submitted to FSIL ME
Cambodia long-term	Submitted to AOR	Submitted to AOR	Submitted to AOR	Submitted to FSIL AOR
Kenya long-term	Submitted to AOR	Submitted to AOR	Submitted to FSIL ME	Submitted to FSIL ME
Nepal short-term	Submitted to FSIL ME	Submitted to FSIL ME	Submitted to FSIL ME	Submitted to FSIL ME
Nigeria short-term	Submission in FY2023	Submission in FY2023	Submission in FY2023	Submission in FY2023
Senegal long-term	Submission in FY2023	Submission in FY2023	Submission in FY2023	Submission in FY2023

For people-based surveys or human subjects research, each PI is responsible for utilizing their respective IRB to obtain approval or exemption of the proposed activities.

Subaward	IRB Approval/Exemption
Bangladesh long-term	Submitted to AOR
Cambodia long-term	Submitted to AOR
Kenya long-term	Submission in FY2023
Nepal short-term	Submitted to FSIL ME
Nigeria short-term	Submitted to FSIL ME
Senegal long-term	Submission in FY2023



## Open Data Management Plan

FSIL continues to partner with Purdue University's Ag Data Services team to ensure that research teams have access to technical support related to data management and sharing. At project onset, Ag Data Services partners with each subaward to develop a data management plan. As project objectives are completed, Ag Data Services supports researchers in cleaning, organizing, and sharing their datasets.

In FY2022, the FSIL management team and Ag Data Services hosted data management work sessions with the two new MSI-led subawards. The workshops introduced researchers to policies and resources related to data collection and dissemination. As an outcome of these sessions, the subawards finalized their data management plans.

Ag Data Services also partnered with the Cambodia QuickStart project in FY2022 to prepare final datasets for publication and sharing. The following datasets were published in Harvard Dataverse<sup>8</sup> and submitted to USAID's Data Development Library (DDL) for review:

- Replication Data of Perceptions of Food Safety Among Cambodian University Students Studying Food Production and Processing; <https://doi.org/10.7910/DVN/5UNUVU>
- Distribution Center Generic *E. coli*, Coliform, and Enterobacteriaceae Detection and Quantification Data; <https://doi.org/10.7910/DVN/0XJF4S>

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<sup>8</sup> <https://dataverse.harvard.edu/dataverse/fsil>

## **Governance and Management Entity Activity**

### **Create and maintain effective management structures and practices that promote the success of active FSIL projects (Management Entity WP Activity 1.1)**

Several mechanisms enabled the FSIL management team to enhance the success of projects and promote knowledge sharing amongst the research community. Monthly meetings were held with each project team to discuss progress, plans, and obstacles. This approach enabled FSIL to proactively address concerns and provide researchers with timely feedback on project implementation. Members of the management team also conducted field visits to Cambodia, Kenya, and Senegal to monitor activities and offer support.

FSIL continued collaboration and coordination with other Feed the Future Innovations, USAID-funded food safety mechanisms, and other donors. Members of the FSIL management team maintained regular meetings with the Food Processing and Post-Harvest Loss Innovation Lab, EatSafe, Business Drivers for Food Safety, and Feed the Future Innovation Lab communities of practice to share updates and stay apprised of aligned activities. FSIL also renewed dialogue and collaboration with the Global Food Safety Initiative to explore opportunities to partner in future activities.

FSIL's first hybrid annual meeting was held in November 2021. The meeting featured project updates, a dialogue on emerging climate change impacts on food safety, an interactive session on mapping project linkages to nutrition, and strategies to promote DEIA across FSIL activities. The FSIL Gender Working Group also met quarterly to exchange gender research strategies and results. Finally, in their semi-annual reports, FSIL collaborators reported on activities relevant to the Environmental Mitigation and Monitoring Plan, and FSIL and USAID provided oversight and approval of the reported activities.

### **Manage the selection and implementation of MSI-led partnerships for global food safety research through a competitive RFA process (Management Entity WP Activity 1.2)**

FSIL concluded its second RFA process in FY2022, which focused on Minority Serving Institution (MSI)-led partnerships for global food safety research. Two projects in Nepal and Nigeria were selected through the competitive process. The project in Nepal is led by Tennessee State University, a Historically Black College/University (HBCU), and started activities in March 2022. FSIL's project in Nigeria launched in May 2022 and is led by the University of Alaska Fairbanks, which is designated as both an Alaska Native and Native Hawaiian Serving Institution (ANNH) and a Native American-Serving Nontribal Institution (NASNTI). After selection, the FSIL management team provided support to the research teams through the execution of subawards and a series of onboarding workshops.

### **Develop robust MEL, communication, and open data platforms (Management Entity WP Activity 1.3)**

In FY2022, FSIL continued to leverage Piestar DPx as a tool for monitoring, evaluation, and learning. New projects were added to Piestar DPx, and PIs were provided with training and resources for future reporting sessions. As described in the Open Data Management Plan section, Purdue's Ag Data Services team continued to support FSIL projects with data collection, storage, and dissemination.

As projects accelerated their research activities, FSIL communication efforts highlighted their progress and early findings. A regular e-newsletter was published, and more frequent posts on Twitter and LinkedIn resulted in the growth of FSIL's social media presence to a combined 1,183 followers as of September 30. Agrilinks and the FSIL website served as key platforms for knowledge sharing, with 12 unique posts published in FY2022. The program also hosted a webinar<sup>9</sup> in August 2022 that showcased lessons learned from FSIL's previously funded global coronavirus food safety task force. The virtual event attracted 298 registrants.

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<sup>9</sup> <https://ag.purdue.edu/food-safety-innovation-lab/projects/resources/responding-to-food-system-disruptions-lesson-learned-from-a-global-coronavirus-task-force-webinar-video/>

**Engage FSIL Advisory Committee and Technical Experts in providing guidance and support to ongoing activities (Management Entity WP Activity 1.4)**

At the FY2022 annual meeting, the FSIL Advisory Committee and Technical Experts met with project leaders to discuss their achievements and provide input on their planned activities. Identifying and strengthening linkages between food safety and nutrition was a focus throughout FY2022 that was supported by the Advisory Committee. After the annual meeting, the Advisory Committee and Technical Experts engaged with the FSIL management team to discuss their experiences, feedback, and suggestions for future work.

In addition, the FSIL management team held internal semi-annual team reflection meetings to review feedback from the Advisory Committee and Technical Experts and to assess the Innovation Lab's progress using the program's MEL plan as a guide. The meeting outcomes were utilized to shape guidance to subawards and future work plans.

## Other Topics

### FSIL Partnership with Neogen Corporation

In FY2022 FSIL established a partnership with Neogen Corporation to support FSIL's project in Nigeria. Neogen, which recently combined with 3M Food Safety, is a global leader in technology for rapid assessment of food safety risks in commercial environments, including indicator testing and pathogen detection. This partnership will facilitate the project's assessment of household vulnerability to foodborne illness with ready-to-use supplies that will allow researchers to assess the presence of indicator microbes for foodborne illness on food contact and non-food contact surfaces in a large number of households in Nigeria (n=250). The co-investment by FSIL and Neogen in supplies will allow the team to collect and analyze samples using a validated, rigorous assessment protocol of multiple dilutions and duplicate plating rapidly and accurately. Specifically, sampling and analysis supplies to be provided for the project include 3M Petrifilm™ Aerobic Count Plates, 3M Petrifilm™ Rapid E. coli/Coliform Count Plates, Quick Swabs, 3M Clean-Trace swabs, and a portable, handheld luminometer for real-time results.

In addition to this philanthropic mobilization of private-sector resources to address food safety, Neogen is also providing guidance and support, including opportunities for networking, strengthening capacity in environmental sampling for food safety in Nigeria, and offering technical assistance to the project. In meetings with the FSIL ME and project PIs, Neogen provided guidance on refining the sampling strategy. In FY2023, Neogen will hold a virtual training with project staff in Nigeria to review the protocols and answer questions immediately before sample collection.

For Neogen, the partnership aligns with their mission to support global food security through food safety, mobilizing their resources to address the humanitarian challenge of cycles of foodborne illness and malnutrition. Through this partnership, researchers in Nigeria will have access to cutting-edge technology used in commercial settings around the world to monitor food safety risks, evaluate the effectiveness of cleaning protocols, and identify reservoirs that harbor microbes. The project will benefit from an efficient, accurate assessment of the risk of foodborne disease in a large sample of households, which can be analyzed in conjunction with child nutrition status to identify gaps in food safety practices in the home. The partnership will also strengthen the capacity for performing food safety research in Nigeria as in-country researchers gain experience with the Neogen technology.

### Capacity Strengthening Through Student Engagement with Risk Ranking, Social Science Research Methods, and Gender-Sensitive Research Methods

FSIL project activities have provided opportunities for graduate and undergraduate students in-country to strengthen their capacity to carry out impactful food safety research, in addition to the lab-based microbiology skills used to assess food safety risks. Participation in FSIL project activities in FY2022 enabled students to develop expertise and practice with research methods that will increase the impact and effectiveness of food safety research. They include training in risk-based, community-engaged approaches to food safety prioritization; experience with social sciences research methods that support social and behavioral change to reduce foodborne illness; and training in gender-sensitive research methods that ensure women's roles and access to resources are centered in projects' food safety practice recommendations and outreach efforts.

***Kenya: Using Risk-Informed Approaches to Food Safety.*** In FY2022, a risk ranking workshop was held with female smallholder poultry producers in Kenya to prioritize food safety interventions for testing to reduce the risk of foodborne disease from bacterial pathogens, including *Salmonella* and *Campylobacter*. The exercise was an implementation of the "FAO Guide to Ranking Food Safety Risk at the National Level,"<sup>10</sup> which provides

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<sup>10</sup> <https://www.fao.org/documents/card/en/c/cb0887en/>

a robust scientific framework to prioritize food safety hazards based on their impact on human health. During the three-day risk ranking workshop, the poultry farmers and local veterinary experts participated in a process of review, reconsideration, and revision to reach a consensus on their ranking of risks and highest-priority food safety interventions. Graduate students from KEMRI and the University of Nairobi were present as observers, gaining experience with this stakeholder-led method for risk-based food safety efforts. For most students, it was their first experience with risk-based food safety decision-making, a framework that holds great promise to result in impactful, evidence-based food research and outreach. Students gained valuable perspectives on direct collaboration with farmers in food safety research, with several noting the effectiveness of the stakeholder-centered methodology in developing solutions that were practical for farmers, increasing the potential for sustainable practices and policies.

***Cambodia: Training in Social Sciences Research Methods and Leadership Development.*** Strengthening food safety relies on social and behavioral change to drive the adoption of food safety practices and the evolution of food safety culture. The foundation for the design of effective food safety outreach is social science research into food chain actors' knowledge, attitudes, and practices as well as a clear understanding of gender roles, decision-making, and access to resources. FSIL's Cambodia project has strengthened the capacity of students to support social-behavioral change in food safety.

In FY2022, 48 students in Cambodia were trained in conducting gender-sensitive surveys, interviews, and focus groups through a virtual five-week course on Qualitative Research Methods. The class introduced students to behavior change theory, feminist theory, research methodologies, creating interviews, understanding attitudes and perceptions using focus groups, and coding and analyzing data. Many students earned internationally recognized certification to conduct human subjects research from the Collaborative Institutional Training Initiative (CITI). Several exceptional students were selected to participate in the projects' surveys, interviews, and focus groups with female vegetable farmers in FY2022, playing key roles in the successful collection of data. Through the course as well as participation in project research, these future leaders developed a framework for and experience with social science research to equip them for future roles in research and policy.

Also in FY2022, the Cambodia project's Women's Leadership Program hosted eight virtual training sessions for undergraduate students from RUA and ITC focused on leadership, strengths and confidence-building, community engagement, and collective action to improve the use of food safety practices. The highest-achieving students from these trainings collaborated with project leaders to facilitate two in-person workshops to empower female vegetable producers to become food safety leaders in their communities; the PIs noted that the students were proficient to lead the second workshop without additional assistance from them. Students reported gaining greater self-confidence in their leadership ability from the experience, strengthening a vital capacity for these youth involved in food safety research

***Senegal: Training in Gender-Sensitive Research Methods.*** In FY2022, FSIL's Senegal project conducted a one-day training workshop on gender and agriculture with a focus on the Senegalese dairy sector. Of the approximately 40 attendees, many were researchers and students associated with ITA. The purpose of the five-hour interactive workshop was to familiarize agrifood-focused researchers, civil society, and formal private sector actors with gender theory and key concepts, the gender dynamics in agrifood systems in low-income countries, and the way gender influences food safety along the Senegalese dairy value chain. Interactive group discussions during the workshop identified obstacles to women's empowerment in the dairy value chain, including culture, religion, and tradition. In addition, participants noted the need to find, develop, and support male allies with standing in their communities and families to help shift gendered norms and behaviors that impact food safety. Participation in the workshop successfully introduced students to a gender lens on food safety and raised awareness of the opportunities and challenges presented by gender roles, strengthening their capacity to conduct effective food safety research and implement equitable change in food safety practices.

## Raising Awareness of Microbial Food Safety Risks

A persistent challenge to strengthening food safety around the world is the relative lower awareness of the food safety risks posed by microbial pathogens compared to chemical hazards, antibiotics, and aflatoxins. Because the microorganisms which cause foodborne illness are not detectable by the naked eye and do not immediately change a food's appearance or odor—as well as the potential lag time between exposure and sickness—producers, distributors, and consumers are often unaware of their risk to food safety. For all FSIL projects, raising awareness of microbial food safety risks is essential to creating an enabling environment for food safety, and opportunities to hold workshops to raise awareness of microbial food safety risks were pursued in FY2022 as pandemic restrictions on in-person gatherings were relaxed.

**Bangladesh.** In July 2022, the project held a “sensitization meeting” at Bangladesh Agricultural University, to introduce the project and its focus on the economics of the production of safer fish, including microbial food safety. The approximately 170 participants included staff from several universities, research institutes, and aquaculture organizations as well as fish farmers and businessmen. Among the participants were representatives from the Department of Fisheries, the Bangladesh Food Safety Authority, and the Bangladesh Fisheries Research Institute. This large meeting helped raise awareness of the risk of microbial foodborne disease among fish food chain actors, researchers, and policymakers and solidified stakeholder and government support for the project and its objectives.

**Senegal.** In May 2022, FSIL's project in Senegal held workshops in the St. Louis, Matam, and Louga regions, engaging more than 100 dairy value chain participants in learning the fundamentals of microbial food safety. The workshops provided an introduction to microbiology, sanitation, and product and process controls as well as a presentation on gender and youth in the dairy value chain, with a focus on immediate, practical knowledge. Some participants shared that this was the first workshop they had attended which focused on basic hygiene practices that affect microbial food safety, such as Good Management Practices and general sanitation. In addition, workshop leaders provided information on practical interventions to reduce microbial foodborne disease, including excluding milk from cows with mastitis, which can introduce a food safety risk, as well as consistent use of refrigeration at aggregation locations where milk is held before transport or processing. This series of workshops raised awareness of microbial food safety risks among dairy producers and processors and is shaping the project's future outreach activities on hygiene practices

**Cambodia.** In August 2022, FSIL's project in Cambodia held two women's leadership workshops for female vegetable producers in the provinces of Siem Reap and Battambang. Part of the Women's Leadership Program (WLP), the workshops aimed to develop leadership abilities and foster collective action to translate food safety research into local, female-led development in rural communities of Cambodia. The workshops included a session on vegetable value chain risk assessment for microbial pathogens, which organizers noted drove the biggest realizations among the farmers. It was so successful that the in-country partner organization Banteay Srei requested extra value chain cards—with images depicting the various actors involved in the vegetable value chain—to replicate the session and share the microbial food safety learnings with other female vegetable farmers.

## Development of a Logic Model to Guide the Gender Working Group

Across countries and value chains, women have untapped potential to impact food safety. Therefore, to strengthen food safety, research must account for gender roles, decision-making power, and access to resources to create impactful outreach activities and inform food safety practices and policies. To ensure gender is considered in all project activities, all FSIL long-term subawardees have a gender specialist who participates in quarterly FSIL Gender Working Group meetings. The goal of the Gender Working Group is to provide FSIL gender specialists with the opportunity to network and learn from each other by offering mutual support and encouragement. In FY2022, the group developed a Gender Working Group Logic Model to outline their objectives, assumptions, assets, challenges, inputs, outputs, and outcomes. The formalization of the group's

efforts through the logic model will add clarity and rigor to FSIL's gender work as well as serve as an example for other Innovation Labs interested in creating a group to focus on the integration of gender into project plans.

### **Management Entity and Past Subaward Publications and Presentations**

Kangethe, E., Mutua, F. K., Roesel, K., Ntwawubizi, M., Kankya, C.... (2021). A review of the food safety architecture in the East African Community. <https://hdl.handle.net/10568/115586>

Mutua, F. K., Masanja, H., Chacha, J., Kangethe, E., Kuboka, M., & Grace, D. (2021). A rapid review of foodborne disease hazards in East Africa. <https://hdl.handle.net/10568/116679>

Oliver, H. (2021). Safely feeding the future: food safety research for development. Presentation at 4th Food Innovation and Engineering (FOODIE) Conference, Virtual.

Oliver, H. (2022). Minority serving institution partners research update. Presentation at Nutrition Partner's Meeting, Washington, D.C.

Oliver, H. (2022). Food Safety Innovation Lab introduction Feb. 2022. Presentation at Government-University-Industry-Research Roundtable, Virtual.

Oliver, H. (2022). Minority serving institution partners research update. Presentation at IL Director's meeting, Washington, D.C.

Oliver, H. (2022). Lessons learned from food safety systems in developing countries. Presentation at International Association for Food Protection Annual Meeting, Pittsburg, PA.

Worobo, R. W. (2022). Food Safety Innovation Lab Introduction. Presentation at Future Africa conference, Virtual.

## Issues

### Bangladesh

The University of Dhaka has experienced difficulty in reactivating its System for Award Management (SAM) registration, which has delayed the receipt of its funds from Texas State University. The FSIL management team is working with the Co-PI at the University of Dhaka to attempt to resolve the situation. As experienced by the Nigeria project, the most significant barrier is that the former Entity Administrator for SAM.gov is not a central university administrator (as is common in U.S. universities) but a researcher that previously received funding from the U.S. government.

### Kenya

Some project activities were postponed due to delays in securing Institutional Review Board (IRB) approvals from multiple institutions involved in the process. The requirements for IRB approval and approach to human subjects research vary by institution, and it has taken time and effort to align expectations and protocols for all collaborators. Before IRB approvals were obtained from all institutions, researchers at the University of Nairobi initiated data collection. The PI at The Ohio State University identified the issue and came to a shared understanding with the University of Nairobi that the prematurely collected data could not be used.

### Nigeria

Due to turnover in university administration, the SAM registration of the project's in-country partner institution, Bowen University, had not been renewed promptly and became inactive prior to FY2022. The complexity of the SAM.gov website, coupled with identifying a new Entity Administrator, created significant challenges for Bowen University. The FSIL management team worked extensively with Bowen University to designate a new Entity Administrator and renew their SAM registration. FSIL submitted the project's subaward requests to USAID while the SAM reactivation process was ongoing, but USAID did not review and provide feedback until seven weeks after submission. This slowed Purdue's ability to issue subawards and commence project implementation, and the project's start date was formally delayed by two months to May 1, 2022.

### Senegal

Leadership changes and organizational restructuring at the Institut Senegalais Recherches Agricoles (ISRA) and Conseil National du Développement de la Nutrition (CNDN) contributed to delays in establishing a formal memorandum of understanding among Senegalese project partners. This resulted in an interruption of fund disbursement to Senegalese partners, which hindered the full participation of the research team.



## Future Directions

### Management Entity

In FY2023, the FSIL management team will continue holding monthly meetings with each subaward to monitor activities and provide guidance. The program's second in-person annual meeting will be held in November 2022 with FSIL project leaders, USAID, advisory committee members, and technical experts to collaborate and share progress. The FSIL management team plans to meet with technical experts and advisory committee members for input and feedback on strategies to strengthen the FSIL portfolio, particularly strategies to increase local leadership within projects as well as private sector engagement. The annual Virtual Project Exchange will be redesigned to focus on collaborations to strengthen in-country impacts and long-term sustainability.

FSIL will continue promoting project activities, accomplishments, and data sharing through quarterly e-newsletters, Twitter, LinkedIn, and Agrilinks. Purdue's Ag Data Services will continue to support FSIL with data sharing on Harvard Dataverse and the DDL. The Gender Working Group, comprised of gender leads in each focus country, will continue to meet quarterly to share lessons learned, provide support, and strengthen the community of gender researchers in food safety projects. In FY2023, FSIL plans to submit a manuscript for publication on engagement with Minority Serving Institutions designed to share lessons learned and resources from the most recent RFA.

The FSIL management team will support an external performance review of the program, which will assess the research program performance, capacity building efforts, and overall management effectiveness. The FSIL management team will continue to foster relationships with USAID Missions and other implementing partners to identify opportunities for collaboration and knowledge sharing.

### Bangladesh Long-Term Subaward

Researchers will complete the analysis of antibiotic residues, bacterial pathogens, and heavy metals in experimental and control fish samples. If the budget allows, the team will conduct additional field trials to analyze the costs and benefits of producing safer fish to fill a knowledge gap identified by stakeholders. The researchers will implement surveys and focus group discussions with consumers and value chain actors, including women-focused groups. These activities are designed to evaluate knowledge, attitude, and practices regarding food safety and risk issues related to fish and selected frozen chicken products. A hedonic analysis will be conducted through a survey of fish retail outlets and consumers, which will quantify the impact of safety attributes on price.

### Cambodia Long-Term Subaward

In FY2023, researchers will complete sample collection, whole genome sequencing, and analysis for the longitudinal study. Following completion, collaborator meetings will be held to share the findings of the study and identify the next steps. The project team will develop a plan for intervention studies and initiate research, and a willingness-to-pay study will be initiated alongside WorldVeg. Finally, researchers will submit multiple manuscripts for publication, including those focused on food safety perceptions and sanitation of food contact surfaces typical in traditional markets in Cambodia.

### Kenya Long-Term Subaward

In the first half of FY2023, the project plans to distribute findings from the risk prioritization workshop, complete the gender analysis, conduct laboratory training, initiate the microbiological survey, and prepare for the initiation of the intervention evaluation study. During the remainder of the year, researchers expect to complete both the field work for the microbiological baseline survey and evaluation study as well as initial data analysis. The team also expects to obtain Foodborne Disease Burden Epidemiology Reference Group data for Kenya, complete the baseline model for the quantitative microbial risk assessment, and collect the data needed for the cost-benefit analysis of the selected intervention.

### **Senegal Long-Term Subaward**

Survey-based activities conducted by graduate students are expected to be completed in the first half of FY2023, and results will inform future lab-based studies on food safety issues and interventions. Data generated from student projects will be presented at the annual FSIL meeting and further developed into research papers. The project team intends to offer another round of food safety-related training in conjunction with ISEP and CERFLA for dairy value chain actors. Researchers will also develop a work plan with CNDN to outline the role of food safety and its relation to nutrition in the dairy value chain.

### **Nepal Short-Term Subaward**

In FY2023, the project team will analyze the data collected from the consumer household survey to derive meaningful inferences. They will also conduct a producer survey of farmer/vegetable growing business households representing all provinces in Nepal. This survey is designed to investigate the incentives for safer produce production by examining food safety practices among fresh produce growers and their impacts on costs, revenues, and well-being. Finally, researchers plan to communicate their findings through conference papers, journal articles, training, and seminar programs involving project stakeholders.

### **Nigeria Short-Term Subaward**

Researchers will focus on data collection over the next 12 months. In early FY2023, they will recruit and train 20 enumerators who will be responsible for conducting door-to-door recruitment of participants and data collection for the household survey and child anthropometric assessment. Data collection for this activity will begin in late 2022. They will also train an additional four enumerators who will be responsible for conducting the environmental sanitation assessment that will begin in early 2023. Mothers will be recruited to participate in the visual documentation of their lived experiences interacting with factors in the physical environment that impact food safety. During this time, researchers will also be simultaneously working to identify and recruit key stakeholders who will participate in the key informant interviews.

## Appendix A – List of Awards to U.S. Partners

**Project Name:** Feed the Future Innovation Lab for Food Safety (Management Entity)

**Project Dates:** 06/25/2019 to 06/24/2024

**Institution:** Cornell University

**Funding:**

- FY2022: \$391,104
- Project to date: \$774,222

**Project Name:** Enhancing Food Safety in Fish and Chicken Value Chains of Bangladesh (Bangladesh Long-Term Subaward)

**Project Dates:** 10/01/2020 to 3/31/2024

**Institution:** Texas State University

**Funding:**

- FY2022: \$111,217
- Project to date: \$312,339

**Project Name:** Reducing Foodborne Pathogen Contamination of Vegetables in Cambodia: Innovative Research, Targeted Interventions, and Impactful, Cambodian-Led Engagement (Cambodia Long-Term Subaward)

**Project Dates:** 10/01/2020 to 3/31/2024

**Institution:** Kansas State University

**Funding:**

- FY2022: \$210,157
- Project to date: \$420,732

**Project Name:** Reducing Foodborne Pathogen Contamination of Vegetables in Cambodia: Innovative Research, Targeted Interventions, and Impactful, Cambodian-Led Engagement (Cambodia Long-Term Subaward)

**Project Dates:** 10/01/2020 to 3/31/2024

**Institution:** Purdue University

**Funding:**

- FY2022: \$26,223
- Project to date: \$39,268

**Project Name:** Chakula Salama: A Risk-based Approach to Reducing Foodborne Disease and Increasing Production of Safe Foods in Kenya (Kenya Long-Term Subaward)

**Project Dates:** 10/01/2020 to 3/31/2024

**Institution:** The Ohio State University

**Funding:**

- FY2022: \$233,564
- Project to date: \$441,544

**Project Name:** Food Safety Capacity Building in Senegal: Enhancing Resilience of the Dairy Value Chain by Leveraging Public-Private Partnerships (Senegal Long-Term Subaward)

**Project Dates:** 10/01/2020 to 3/31/2024

**Institution:** University of Georgia

**Funding:**

- FY2022: \$200,000
- Project to date: \$399,999

**Project Name:** Drivers of Safer Food Production and Consumption in Nepal: Understanding the Adoption of Food Safety Practices and Consumer Consciousness in Fresh Produce (Nepal Short-Term Subaward)

**Project Dates:** 03/01/2022 to 02/28/2024

**Institution:** Tennessee State University

**Funding:**

- FY2022: \$64,635
- Project to date: \$64,635

**Project Name:** Drivers of Safer Food Production and Consumption in Nepal: Understanding the Adoption of Food Safety Practices and Consumer Consciousness in Fresh Produce (Nepal Short-Term Subaward)

**Project Dates:** 03/01/2022 to 02/28/2024

**Institution:** Arizona State University

**Funding:**

- FY2022: \$18,446
- Project to date: \$18,446

**Project Name:** Household-level Food Safety Risk and Community Capacity to Monitor and Mitigate Foodborne Illness in Nigeria (Nigeria Short-Term Subaward)

**Project Dates:** 05/01/2022 to 04/30/2024

**Institution:** University of Alaska Fairbanks

**Funding:**

- FY2022: \$60,383
- Project to date: \$60,383

**Project Name:** Household-level Food Safety Risk and Community Capacity to Monitor and Mitigate Foodborne Illness in Nigeria (Nigeria Short-Term Subaward)

**Project Dates:** 05/01/2022 to 06/30/2022

**Institution:** University of Connecticut

**Funding:**

- FY2022: \$2,625
- Project to date: \$2,625

**Project Name:** Household-level Food Safety Risk and Community Capacity to Monitor and Mitigate Foodborne Illness in Nigeria (Nigeria Short-Term Subaward)

**Project Dates:** 07/01/2022 to 04/30/2024

**Institution:** Utah State University

**Funding:**

- FY2022: \$27,937
- Project to date: \$27,937

## Appendix B – Success Stories

### Success Story 1: Stakeholder Input Shapes Food Safety Research for Kenya’s Smallholder Poultry Farms

*Kenya – June 22, 2022*

Poultry production is vulnerable to contamination with bacterial pathogens such as non-typhoidal *Salmonella*, the [leading cause of death from foodborne disease in Africa](#). Locally-led decision making about research priorities will be better positioned to generate sustainable, scalable food safety solutions. Leveraging this approach, a team of [Kenya- and U.S.-based researchers](#) funded by the [Feed the Future Innovation Lab for Food Safety](#) held a risk ranking workshop in March with female smallholder poultry farmers in Kenya.

In the three-day workshop, held at the Kenya Medical Research Institute (KEMRI), researchers used the [FAO Guide to Ranking Food Safety Risks at the National Level](#) to set the course for their project’s food safety research and outreach. The guide, released in 2020, was designed to help decision-makers rank the public health risk posed by foodborne hazards in their countries.

During the workshop, project researchers introduced the concept and process of risk ranking and explained potential interventions to reduce the risk of foodborne disease. The farmers and local veterinary experts gathered in breakout groups to discuss and rank risks as well as potential food safety interventions. Groups undertook an iterative process of review, reconsideration, and revision until a consensus about priorities emerged: the handling of carcasses and training on pre- and post-slaughter food safety practices. Workshop participant Sharon Wanjiru, who farms broiler chickens with her mother, appreciated the workshop’s process and outcomes.

“The workshop created room for interaction by our groupings to reach solutions with different people from different areas, hence new knowledge was gained on my side,” said Wanjiru. “I also learned the importance of pre-slaughter and post-slaughter procedures on producing safe food for consumers.”

The workshop was also an effective capacity strengthening activity for students from KEMRI and the University of Nairobi. For most, it was their first opportunity to see risk ranking in action, and they noted the value of a stakeholder-centered approach.

“I learned a lot about risk ranking and prioritization, and it was fascinating to interact with the farmers, seeing their understanding of risk and insights into the likely challenges to addressing each identified risk,” said Abdiaziz Bainah, a Ph.D. candidate at the University of Nairobi.

This sentiment was echoed by KEMRI graduate student Noel Kambi.

“Involving farmers in the risk ranking process was critical because it allowed them to express their thoughts on the ideas presented, including what is useful and what can be implemented,” she said.

The process is a model for locally-led, values-driven food safety research.

“A lot of food safety decisions are made in an ad hoc or reactive manner, so the main benefit of the risk ranking exercise is that it helps focus on the biggest priorities,” said Barbara Kowalczyk, the project’s principal investigator and an associate professor of Food Science and Technology at The Ohio State University. “We rank the risks based on public health impact but then prioritize those based on the stakeholder community input—you can think of it as using community values to decide where research should focus next.”



Photo caption: Researchers from KEMRI and OSU conduct site visits with poultry farmers in Kiambu County, Kenya. (Photo credit: Far on Foot, LLC)

## Success Story 2: Food Safety Innovation Lab Launches MSI-Led Partnerships for Global Food Safety Research

*Global – April 27, 2022*

Despite Minority Serving Institutions' (MSIs) demonstrated expertise in global food, agriculture, and rural community issues, they lead a limited portfolio of projects within USAID-funded programs. A recent, competitive Request for Applications (RFA) by the [Feed the Future Innovation Lab for Food Safety](#) sought to address this discrepancy by recruiting MSI-led teams to conduct two food safety research projects in Africa and Asia.

The RFA process engaged more than 38 researchers from 23 MSIs and was designed to support researchers in developing competitive proposals. Features included an initial ideation session to help applicants strengthen their project ideas, provision of templates to streamline applications, and meetings with the FSIL leadership and technical experts to refine full proposals prior to submission. In addition, anonymous surveys of participants were conducted throughout the process to gather feedback on the RFA experience of applicants.

“It is our responsibility to be more inclusive, to seek out and create opportunities to make a systemic change,” said FSIL Director Haley Oliver. “We hope that openly sharing information about our process can help others to initiate change.”

Levon Esters, associate dean for Diversity, Equity & Inclusion and Faculty Affairs at Purdue Polytechnic Institute and professor of Agricultural Sciences Education, served as an advisor in the development of the RFA and outreach to MSIs.

“Because MSIs often have a teaching-intensive focus, they sometimes lack the research infrastructure to manage large-scale projects,” said Esters. “So, in addition to positioning MSIs to address global issues related to food safety research, we also recognized an opportunity to help build capacity among MSIs to engage with USAID-funded projects and become the leaders within those projects.”

One team, led by Aditya Khanal, associate professor of agribusiness at Tennessee State University, will collaborate with Nepali partners to assess food safety risks and identify economic incentives that could transform local food safety policies and practices.

“I highly appreciate the facilitation I received from FSIL management, and I am excited to be part of the team and contribute to food security and food safety challenges in target Feed the Future Initiatives,” said Khanal.

Andrea Bersamin, associate professor of nutrition at the University of Alaska Fairbanks, will lead a project to identify activities to mitigate and prevent household foodborne illnesses and related malnutrition in urban Nigeria.

“I am very excited to be working with an experienced interdisciplinary and international team to understand household vulnerability to food safety in Nigeria,” said Bersamin. “I’m grateful for the FSIL’s project commitment to supporting MSIs and their guidance that led to the funding of this project.”

The RFA aligns with the USAID Center for Nutrition’s emphasis on addressing Diversity, Equity, Inclusion and Accessibility.

“I encourage other partners to follow the Food Safety Innovation Lab’s lead and prioritize USAID’s New Partners Initiative and Diversity, Equity, Inclusion and Accessibility Strategy,” said Jim Barnart, USAID/RFS Assistant to the Administrator. “We must leverage a broad range of experiences and expertise to work towards ending hunger, poverty, and malnutrition across the globe.”



Photo caption: Dr. Levon Esters, associate dean for Diversity, Equity & Inclusion and Faculty Affairs at Purdue Polytechnic Institute and professor of Agricultural Sciences Education and Dr. Haley Oliver, Director of the Food Safety Innovation Lab, professor at Purdue University. (Photo credit: Tom Campbell)



### Success Story 3: Bridging the Food Safety ‘Implementation Gap’ by Strengthening Social Science Research Capacity

*Cambodia – June 28, 2022*

Progress in food safety can stumble in the final mile: Innovations to reduce the risk of foodborne illness are only effective if people are willing and able to adopt them. Social science tools can help fill this “implementation gap,” enabling researchers to understand the incentives and barriers to the adoption of new food safety practices. A [Feed the Future Innovation Lab for Food Safety](#) project in Cambodia has trained and certified over 200 students in developing surveys and conducting human subjects research, including a recent course on gender-sensitive surveys, interviews, and focus groups.

The courses are key steps in strengthening social science and gender-responsive research capacity in Cambodia, and the online format enabled the participation of students from several institutions as well as agriculture professionals like Panha Suon from the Cambodian Partnership for Sustainable Agriculture.

“Realizing that qualitative research goes beyond just telling what happens, but why something happens was important to me,” said Suon, who plans to use surveys in ecological agriculture research. “This course helped me acquire the skills and knowledge to create curated and locally-targeted content based on reliable sources and legitimate research methodology.”

Taught by researchers at the Royal University of Agriculture and Purdue University, the course was offered as part of a [four-year project to strengthen the food safety of fresh vegetables in Cambodia](#). While their immediate goal was to train and recruit enumerators to support the project’s food safety research, the courses are creating a broad cohort versed in social science, gender-sensitive research methods.

“I especially valued learning about the gender-based approaches because women play an important role in social development and decision-making,” said Lak Sivcheng, who holds a degree in electrical engineering from the Institute of Technology of Cambodia.

Designed by Purdue Ph.D. student Leah Thompson and Sreymom Sieng, the project’s gender expert, the class introduced the fundamentals of qualitative research before delving into behavior change theory, feminist theory, research methodologies, creating interviews, understanding attitudes and perceptions using focus groups, and coding and analyzing data. Participants also had the option to earn internationally recognized certification to conduct human subjects research from the Collaborative Institutional Training Initiative.

Participants can further hone their skills by participating in the project’s data collection to identify current practices and perceptions of food safety to inform the design of food safety interventions for the vegetable value chain.

“I liked that this course is not just an online course, but it has a hands-on, active research project,” said Suon. “We will get out in the field to survey vegetable sellers, and it will allow us to experience some of the stages of real research, such as interviewing, interpreting and transcribing, and hopefully data analyzing.”

This is the third research methods course the project has offered in Cambodia. Engaged learning courses in 2021 focused on quantitative research methods and survey development. The resulting surveys developed through the courses have been used to measure food safety knowledge and practices among Cambodian vegetable vendors.



Photo caption: Data collection in a Cambodia vegetable market (Photo credit: Jessie Vipham, Kansas State University)