



**FEED THE FUTURE**

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



# THE INTEGRAL ROLE OF FOOD SAFETY IN STRENGTHENING FOOD SYSTEMS

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## PURPOSE

Food safety is an increasingly relevant development priority that underpins achieving sustainable progress toward the Global Food Security Strategy (GFSS), USAID's Multi-Sectoral Nutrition Strategy (MSNS), and United Nations Sustainable Development Goals (SDGs). To maximize our investments and make progress toward the GFSS objectives of agriculture-led economic growth, strengthening the resiliency of people and systems, and fostering well-nourished communities, particularly women and children, USAID is promoting the adoption of improved food safety practices throughout the food system.

This technical brief will:

1. Provide the latest evidence linking food safety to GFSS development objectives.
2. Highlight why food safety is a growing development priority and how it plays a key role in achieving outcomes including improved nutrition; Water, Sanitation, and Hygiene (WASH); resilience; gender equity; and agriculture-led economic growth.
3. Outline the utility of a risk-based approach and steps USAID Missions can take to incorporate food safety into planning and programming.
4. Cite illustrative case studies of food safety challenges and how the U.S. Government works with local organizations, development partners, and local governments to address these issues.

## WHY FOOD SAFETY MATTERS

Food safety plays a foundational role in achieving food security. Improper food safety practices cause negative health and economic consequences, including foodborne diseases, which are illnesses resulting from consumption of contaminated or naturally harmful foods or beverages. The first global study of foodborne disease by the World Health Organization's (WHO) Foodborne Disease Burden Epidemiology Reference Group (FERG) examined 31 foodborne hazards and found that they were responsible for 600 million episodes of foodborne illness and approximately 420,000 deaths in 2010. This amounts to a global burden of 33 million disability-adjusted life years (DALYs), on the same order of magnitude as HIV/AIDS, malaria, or tuberculosis.<sup>1</sup> Up to 29 percent of diarrheal diseases are caused by unsafe food, leading to 200,000 deaths per year in children under five years of age. Unsafe food also has significant economic consequences, via reduced productivity and income, due to the time and cost associated with treating foodborne diseases. The World Bank estimates that the total productivity loss associated with foodborne disease in low- and middle-income countries

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<sup>1</sup> Estimated 2015 global burden of tuberculosis was 40 million DALYs, and 66 million for malaria. Additional hazards, such as arsenic, *Staphylococcus aureus*, and *Vibrio parahaemolyticus*, are being examined by FERG in a second round of analysis, and will further amplify these highly conservative estimates.

(LMICs) amounts to \$95.2 billion (in 2016 terms), and that the cost of treatment constitutes an additional \$15 billion.<sup>2</sup>

### Food Safety Hazards

Food safety hazards can be grouped into three major categories:

- 1) Biological hazards: Living organisms (viruses, bacteria, protozoa, fungi, and parasites) that have the ability to cause infections or produce toxins injurious to health.
- 2) Chemical hazards: Natural or artificial chemicals originating from agriculture, industrial processes, or environmental contaminants.
- 3) Physical hazards: Fragments of different materials, such as stones, metal, or glass.

The [WHO Estimates of the Global Burden of Foodborne Diseases](#) (see page 80 for graphic) revealed that the majority of years lost to illness or premature death from foodborne disease cases were caused by biological hazards, such as bacterial and viral pathogens, and should be prioritized when designing food safety programming. The analysis also revealed that chemicals and toxins, including aflatoxin, make up a smaller fraction of years lost to illness or premature death than biological hazards with the highest prevalence of aflatoxins in Sub-Saharan Africa.<sup>3</sup>

Furthermore, the coronavirus disease of 2019 (COVID-19) has exacerbated inequalities in food security, highlighting the importance of food safety in providing nutritious diets and promoting public health for the world's most vulnerable populations. Supply chain disruptions, reduced regulatory services, and lack of access to fresh food markets caused global food prices to rise almost 20 percent over the past year, hitting the most vulnerable the hardest. Fresh food markets serve an essential function by providing nutritious diets that include fruits, vegetables, and animal-source foods (ASF) to vulnerable populations. In fact, rural African and Asian consumers now purchase up to 70 percent of food from markets.<sup>3</sup> While access to fresh food markets is essential, the nutrient-dense foods they offer are often at the highest risk for contamination. Improper food safety practices and handling of ASF in fresh food markets may increase the risk of a zoonotic disease outbreak. Zoonotic diseases, which are diseases that

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<sup>2</sup> Jaffee, Steven, Spencer Henson, Laurian Unnevehr, Delia Grace, and Emilie Cassou. *The Safe Food Imperative: Accelerating Progress in Low- and Middle-Income Countries*. Washington, DC: World Bank Group, 2019. <https://www.worldbank.org/en/topic/agriculture/publication/the-safe-food-imperative-accelerating-progress-in-low-and-middle-income-countries>.

<sup>3</sup> *The State of Food and Agriculture 2017: Leveraging Food Systems for Inclusive Rural Transformation*. Food and Agriculture Organization of the United Nations (FAO), 2017.

result from animal-human interactions, cause 2.7 million deaths per year globally.<sup>4</sup> Animals, including wildlife and livestock, are capable of spreading zoonotic diseases both premortem and via their food products. Access to and safety of fresh food markets is critical to health and nutrition.

Unsafe food threatens public health and nutrition and undermines food security at local, regional, and global levels. Food safety policies are needed to meet global commitments like the United Nations Sustainable Development Goals (see box below). Reducing biological and chemical hazards in foods is an essential step to achieve a well-nourished population.

### **Food Safety: Alignment with Global Commitments**

Consumption of unsafe food impedes progress toward achieving several of the SDGs, including:

- SDG 1: No poverty. Foodborne diseases are a major cause of ill health among the poor and are associated with lost workdays, out-of-pocket expenses, and reduced value of livestock and other assets. Unsafe food hazards can cause acute or chronic illness that, in extreme cases, lead to permanent disability or death. The presence of food safety hazards can lead to food loss, thus inhibiting economic opportunities, including trade.
- SDG 2: Zero hunger. Unsafe foods have multiple complex interactions with nutrition. For example, unsafe food reduces the uptake of nutrients, particularly for vulnerable consumers, and is associated with malnutrition.
- SDG 3: Good health and well-being. Foodborne diseases negatively impact the most vulnerable populations. Up to 29 percent of diarrheal diseases are caused by unsafe food, leading to 200,000 deaths in children under five years of age. Pregnant women and the elderly are other vulnerable groups.
- SDG 12: Responsible Consumption and Production. When countries strengthen their regulatory, scientific, and technological capacities to ensure that food is safe and of the expected quality, they move toward more sustainable patterns of food production and consumption.

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<sup>4</sup> Salyer, Stephanie J., Rachel Silver, Kerri Simone, and Casey Barton Behravesh. "Prioritizing Zoonoses for Global Health Capacity Building—Themes from One Health Zoonotic Disease Workshops in 7 Countries, 2014–2016." *Emerging Infectious Diseases* 23, no. 13 (December 2017): S55–S64. <https://doi.org/10.3201/eid2313.170418>.

# LINKING FOOD SAFETY ACROSS SECTORS

Beyond food safety's economic, health, and food security impacts, it also impacts core development outcomes of other sectors and issues, including:

- **Nutrition:** When USAID promotes dietary diversity, including increased consumption of fruits, vegetables, and ASF, it is important to simultaneously address the increased food safety risks associated with the consumption of those foods. For example, ASF including meats, fish, shellfish, dairy products, and eggs provide an excellent source of protein and micronutrients including iron, zinc, vitamin A, vitamin B12, and calcium. However, they are easily contaminated by biological contaminants. Food safety interventions should be applied to fresh food markets to help ensure that nutritious ASF and fresh fruits and vegetable products are available to vulnerable populations year-round.
- **Agricultural-Led Economic Growth:** Improving food safety practices can help reduce food loss and waste, therefore improving the economic potential of food producers, handlers, and processors. It is estimated that food losses result in \$4 billion lost annually in Sub-Saharan Africa alone.<sup>5</sup> In Africa, food loss primarily occurs between harvest and the point of sale. Improving cold-chain logistics, storage facilities, and food processing ability can improve food safety and reduce food loss, improving agricultural-led economic growth.
- **WASH:** Water consumed by livestock or used to irrigate crops may contain sewage, pathogens, toxins, or heavy metals. Access to clean water for production, food processing, and preparation plays an important role in ensuring food safety and preventing foodborne disease. Furthermore, poor personal hygiene accounts for roughly 97 percent of foodborne illnesses in food service establishments and homes globally.<sup>6</sup> Interventions, such as handwashing before and after food handling and preparation, can help reduce the burden of foodborne illnesses caused by poor hygiene practices.
- **Trade:** An overall improvement in local or domestic food safety management systems can result in improved regional trade flows of safe, nutritious food and stimulate economic growth. Interventions that improve agricultural production at a domestic level can lead to spillover effects that allow a country to meet sanitary and phytosanitary (SPS) standards and further engage in international trade. Please reference the [GFSS Agricultural Trade Technical Guidance](#) for further information.

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<sup>5</sup> "Food Losses Increase during COVID-19, a Major Hurdle to Africa's Development." FAO, September 28, 2020. <http://www.fao.org/africa/news/detail-news/en/c/1310100/>.

<sup>6</sup> Lambrechts, A.A., I.S. Human, J.H. Doughari, and J.F.R. Jues. "Bacterial Contamination of the Hands of Food Handlers as Indicator of Hand Washing Efficacy in Some Convenient Food Industries in South Africa." *Pakistan Journal of Medical Sciences* 30, no. 4 (July-August 2014): 755-58. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4121692/>.

- **Resilience:** Food safety is an important consideration in resilience programming, since mass contamination of food products can lead to foodborne disease outbreaks with prolonged negative nutrition, health, and economic consequences. Food safety concerns, such as avian influenza, Rift Valley fever, and melamine contamination, have been shown to adversely affect the livelihoods of smallholder farmers and pastoralists. Interventions that strengthen country capacity and commitment to monitor and manage food safety risks minimize the threat of foodborne disease.
- **Gender:** Women tend to suffer more negatively than men from the impacts of foodborne illnesses and pregnant and lactating women are especially vulnerable. In addition, some foodborne diseases cause fetal abnormalities, miscarriage, and stillbirths, and some chemical and biological hazards can be transmitted to newborns through breast milk. Furthermore, women are often key risk managers when it comes to food consumption, preparation, processing, selling, and, to a lesser extent, production. However, women are often disadvantaged by less access to resources, support, and services, such as education and extension. Because of these links, gender analysis is important in assessing and designing interventions to improve food environments by enhancing food safety.
- **One Health and Antimicrobial Resistance (AMR):** A proactive food safety approach is an important part of a One Health approach to control the spread of disease and the emergence of pandemics. One Health is a collaborative, transdisciplinary approach that recognizes the interdependence among the health of the environment, wild and domestic animals, and humans to achieve resilient and sustainable outcomes across complex systems from local to global levels. Interventions should prioritize promoting these nutrient-dense products while adopting proper food safety practices to minimize the risk of zoonotic disease spread. A growing food safety concern that also affects public health is AMR. While antimicrobials are crucial to treat disease and maintain herd health in both livestock and aquaculture, they must be used judiciously and correctly within the sector to prevent selection and dissemination of AMR organisms to humans via food. Key strategies to mitigate the risks of AMR are: i) reduction in the use of antimicrobials, ii) judicious use of antibiotics to treat clinical disease using the recommended dosage and regimen, and iii) integrated surveillance systems for AMR.

## USAID MISSION ENGAGEMENT WITHIN FOOD SAFETY SYSTEMS

All USAID food safety interventions should utilize a preventative, risk-based approach to maximize impact of Mission programs. A risk-based approach<sup>7</sup> involves aligning resources and

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<sup>7</sup> For best practices in risk-based approaches and tools, see <http://www.fao.org/food-safety/food-control-systems/risk-and-evidence-base/risk-based-approaches-and-tools/en/>.

mitigation strategies based on the likelihood that a hazard exists within a food product and the risk of exposure to determine if there is a considerable public health threat. Adopting a risk-based approach involves ongoing risk analyses of the food safety system to determine what hazards are present and pose the greatest threat to public health, nutrition, and economic outcomes. Previously, food safety may have been addressed using a hazard-based approach, which addressed hazards that existed within a food product. A hazard-based approach does not consider the magnitude or impact of the hazard on the intended population. Shifting to a risk-based approach will streamline resources to address food safety concerns with the most significant impact.

USAID food safety interventions should address one or more of the following leverage points to promote safe diets within the food system:

- Inform and empower consumers to demand safe, nutritious food and hold governments and industry accountable to improve the chemical and biological safety of raw foodstuffs from production to consumption.
- Build small- and medium-sized enterprise (SME) capacity to manage food safety risks via utilizing food processing and packaging technologies, like pasteurization or irradiation, to mitigate food safety hazards, as well as learn how to profit from improved food safety practices. SME capacity to develop and implement quality assurance measures to enable compliance with international, national, and local food safety laws and regulations is fundamental.
- Support local governments to establish and enforce clear, unified guidelines and regulations which are evidence- and risk-based. Local governments should also invest in infrastructure and digital technology to enable traceability and reporting tools to reduce the incidence of foodborne diseases.
- Partner for impact at scale with governments, businesses, universities, civil society, and other donors to facilitate behavior change of food handlers and consumers, as well as adoption of appropriate policies, practices, and technologies to promote a unified food safety approach.

Once a USAID Mission decides to address food safety risks within its programming, there are several key steps they should take:

1. Perform a risk analysis or identify if one has already been completed within the country. The analysis will identify the hazard(s) of greatest concern within the local or regional context. The analysis should yield data on the relative burden of each type of food safety hazard and ultimately determine which hazard is most likely to pose a considerable public health threat. The FAO and WHO have developed [several risk analysis tools](#) for different topics, including infant formula, chicken, mycotoxins, and others.
2. Perform a food safety situational analysis. The results of this analysis should include what, if any, projects or programs are already addressing food safety concerns. It should further identify players with a stake in promoting food safety within the local context. This can include local government agencies, donors, implementers, academia, or the private

sector. The ultimate goal of this analysis is to clearly depict the current landscape of food safety activities within the country.

3. Determine line(s) of defense to address the priority hazard of interest identified by the risk analysis. The magnitude of impact of food safety interventions increases when attention is given to multiple lines of defense, as outlined above.
4. Identify partner(s) who can help design and implement a successful food safety intervention. The Bureau for Resilience and Food Security (RFS) manages a portfolio of field support mechanisms that can serve as a key resource or partner to Missions addressing different components of food safety. In collaboration with Mission staff, these mechanisms provide tools for strategic programming. RFS technical advisors based in the Center for Nutrition's Food Safety Division are also available to partner. See Annex 4 for information on these activities.

## METRICS AND RESEARCH: A FOCUS ON FILLING EVIDENCE GAPS

Robust evidence demonstrates clear linkages between poor food safety practices and negative public health, economic, and nutrition outcomes. However, further evidence is needed on effective solutions to mitigate these risks. Future research and data gathering should generate evidence on the socioeconomic factors associated with improving the management of food safety risks in informal market contexts dominated by smallholder farmers and micro-, small-, and medium-sized food enterprises. Food safety-specific metrics and indicators are needed to monitor the progress of food safety interventions. The FAO recently released a [regional guide](#) to develop national food safety indicators that serve country-specific objectives, which can be consulted for further guidance. USAID is also investing in research and analytics to fill knowledge gaps and develop indicators to track progress in improving food safety. USAID partners with universities, international research institutions, and development organizations to conduct food safety research that:

- Examines effectiveness of approaches that create incentives for informal market actors to adopt improved food safety practices.
- Explores the practices of formal market actors and how they influence the adoption of food safety practices among informal actors.
- Compares approaches within one marketshed/system to determine which work best and are most cost-effective.
- Compares cost-effective behavior change approaches that increase consumption of safe, nutritious food (e.g., the role of mass media and consumer advocacy).
- Defines intermediate results and spillover effects related to food loss and waste, affordability, consumption, policy change, and investment.

## CONCLUSION

There is no food security without food safety, and a food system must address basic food security challenges by producing sufficient amounts of safe and nutritious food. USAID programming must work to incorporate food safety across its programming to achieve the objectives of the GFSS, MSNS, and SDGs. This technical guidance outlines initial steps for Missions to consider how to integrate food safety to improve diets within the food system.

# ANNEXES

## Annex 1: Case Studies

Emerging evidence continues to underscore the importance of food safety in promoting nutrition outcomes within food systems. Food safety may be viewed as an emerging area within the development community, but there are several examples of successful food safety measures and interventions addressing a variety of food safety concerns. Below are two case studies highlighting previously successful food safety interventions.

### **Case Study 1: Establishing the Bangladesh Food Safety Authority (BFSA) to Protect Public Health**

**Background:** Bangladesh is among the most densely populated countries in South Asia, and it has one of the newest regulatory structures for foundational government operations, such as ensuring food safety. To address domestic and imported food safety concerns, the Food Safety Act was enacted in 2013 for “the establishment of an efficient and effective authority and for regulating, through coordination, the activities relating to food production, import, stock supply, marketing and sales, so as to ensure the rights toward access to safe food through appropriate application of scientific process...”. The act established the BFSA, which was charged with regulating biological, chemical, and physical hazards in foods, food ingredients, processed foods, and products supporting production (e.g., pesticides).

**Problem:** Prior to the Food Safety Act and establishment of the BFSA, there was limited policy empowering the Bangladesh Government to regulate food safety. There was a recognized need to increase government regulation to protect public health by reducing foodborne disease. Disease burden data in Bangladesh are limited, but diarrheal diseases, enteric fever, and hepatitis are among the most common foodborne diseases.

**Solution:** With support from USAID/Bangladesh Mission, the FAO, the United States Department of Agriculture (USDA), and numerous other partners, BFSA was established in 2015 per the 2013 Food Safety Act under the Ministry of Food. The BFSA is now the main governing body for establishing food safety rules and regulations and subsequent enforcement. Its roles include setting use limits on microbial contamination, heavy metals, food additives, mycotoxins, pesticides, and antibiotics.

With the significant investment and effort focused on enhancing Bangladesh’s food safety regulatory framework, the BFSA activities will rapidly transform the food safety system in Bangladesh, with a significant impact on the overall food safety of the foods and ingredients produced in Bangladesh.

## Case Study 2: Strengthening the Enabling Environment for Food Safety in Africa

**Background:** The continent of Africa is currently experiencing rapid growth of the agrifood market fueled by population growth, urbanization, and income growth. Intra-African food demand is projected to increase by 178 percent by 2050.<sup>8</sup> In addition, Africa has the world's highest per capita incidence of foodborne illness, claiming 137,000 lives a year and causing 91 million cases of sickness and significant constraints on economic growth.<sup>2,9</sup>

**Problem:** SPS regulatory systems are the foundation for safe trade, as they protect countries from risks to public health and to animal and plant life and health. Some SPS-related African challenges include: low levels of investment and compliance with international standards, weak monitoring and enforcement of such regulations by governments, a lack of sufficient incentives for the private sector to engage in formal trade, and various informal, unregulated trade in local markets with poor infrastructure.

**Solution:** In October 2017, the African Union Commission's (AUC) Specialized Technical Committee on Agriculture, Rural Development, Water and Environment, comprised of ministers from African Union member states, requested that its Department of Rural Economy and Agriculture (AUC-DREA) develop an instrument that would help countries harmonize and strengthen their SPS systems. Between 2018-2020, USAID and USDA provided technical assistance through the Food Safety Network working closely with AUC-DREA to deliver on this request. This resulted in an SPS Policy Framework for Africa that was formally adopted by African Heads of State in March 2020. The Framework's objectives address the diverse and intersecting needs and priorities of SPS systems in Africa.

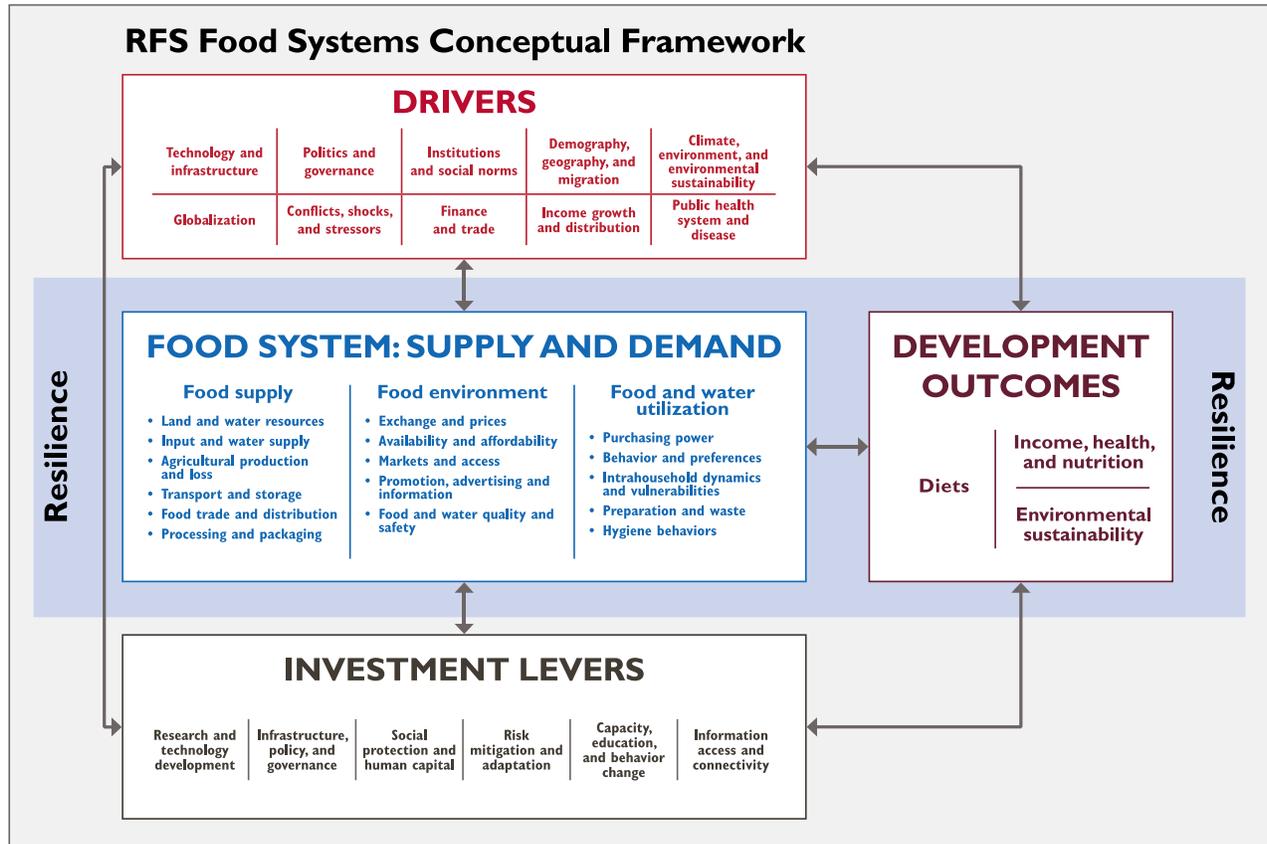
In the coming years, the AUC and its partners will work diligently to coordinate technical and financial resources to realize the Framework's objectives laying the foundation for improved agricultural development and trade of safe food products within Africa and beyond. Only through a multitiered approach to policy formation, adoption, and enforcement will success be achieved.

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<sup>8</sup> Aid for Trade Africa: Food Systems Development for Structural Transformation in Africa. FAO, 2019. <http://www.fao.org/3/ca3833en/CA3833EN.pdf>.

<sup>9</sup> Food Safety in Africa: Past Endeavors and Future Directions. The World Bank, 2019. <https://datacatalog.worldbank.org/dataset/food-safety-africa-past-endeavors-and-future-directions>.

## Annex 2: RFS Food Systems Conceptual Framework



The USAID Bureau for Resilience and Food Security (RFS) recognized the global shift in dialogue toward a food systems approach across the development community. To be an active participant in this global dialogue, RFS developed a Food Systems Conceptual Framework that is specific to nutrition, resilience, and food security. Within this framework, it is easy to visualize how improved food safety can positively impact the primary outcome of diets, as well as secondary outcomes of income, health, and nutrition, ultimately preventing sickness and death from unsafe food. Food safety can be addressed along the investment levers to positively affect the outcomes of the food system. For example, eliciting behavior change through food safety education can create consumer demand for safe foods to improve health and nutrition outcomes. Alternatively, investments in technology to rapidly assess contamination levels could help small and medium enterprises ensure quality and safety of their products. The ways in which food safety is integrated into the food system are endless. Through managing food safety risks within the food system, we can better protect the health and nutritional status of the world's most vulnerable.

### Annex 3: Information on the RFS Centrally Funded Food Safety Mechanisms

1. The [Feed the Future Innovation Lab for Food Safety](#) (FSIL) is a five-year research program awarded in 2019 that focuses on reducing the burden of foodborne diseases from chemical and biological hazards. It leverages expertise in food safety, food production, nutrition, and international development, creating research opportunities for public-private partnerships to amplify USAID's investments throughout the global food system, particularly in value-added sectors. FSIL currently works in Kenya, Senegal, Cambodia, Bangladesh, and Ethiopia.

Point of contact (POC): Ahmed Kablan ([akablan@usaid.gov](mailto:akablan@usaid.gov))

2. [Business Drivers for Food Safety](#) is a five-year activity awarded in 2019 that works with micro-, small-, and medium-sized food enterprises to find market-driven solutions to food safety risks, particularly in informal markets, and help these businesses become agents of positive change in the effort to reduce malnutrition in these market settings.

POC: Lourdes Martinez ([lmartinez@usaid.gov](mailto:lmartinez@usaid.gov))

3. [EatSafe](#) is a five-year activity awarded in 2019 that takes a consumer-centered approach to generate awareness and empower consumers in formal and informal markets to make informed decisions about the food they eat, thus creating demand for safe and nutritious food.

POC: Lourdes Martinez ([lmartinez@usaid.gov](mailto:lmartinez@usaid.gov))

4. The [Food Safety Network](#) (FSN) provides science-based support to strengthen animal and plant health and food safety measures in Feed the Future countries. The FSN does this through: i) country-level SPS assessments and technical advisory services, ii) SPS distance learning tools, and iii) knowledge management.

POC: Lourdes Martinez ([lmartinez@usaid.gov](mailto:lmartinez@usaid.gov))

These mechanisms are available for USAID Mission buy-in to help perform the risk assessments or Food Safety Situational Analysis. For more information, please reach out to RFS via your country support team.