



ACHIEVING FOOD SAFETY:

**A WHITE PAPER ON THE CROSS SECTION OF FOOD SAFETY
AND FARMERS IN LOW- AND MIDDLE-INCOME COUNTRIES**

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Executive Summary

Foodborne illnesses cost low- and middle-income countries \$110 billion in lost productivity and medical expenses each year (World Health Organization 2020). Concern for global food security first gained momentum in 2008 when the G7 countries collectively met and agreed that there was a need for a global food security initiative. Future food systems can address many of the food safety failings and ensure safe and nutritious food for all (Hendriks, et al. 2021). The U.S. government's global food safety response is combined in its [Feed the Future Strategy](#), corresponding [Global Food Security Act of 2016](#), and the updated [Global Food Security Strategy 2022-2026 \(GFSS\)](#) which has embraced food safety as an integral part of a well-nourished population, especially among women and children. The GFSS recognizes the risk of contamination leading to foodborne illnesses in some of the most nutritious foods – fruits, vegetables, meat, dairy, and eggs.

WHO LEADS THIS WHITE PAPER?

The [Corus International](#) family is an ensemble of long-serving, global leaders in international development and humanitarian assistance committed to ending poverty and building healthy communities across Asia, Latin America and the Caribbean, the Middle East, and Africa. Founded in 2020 and drawing on a combined heritage of 150 years, Corus connects and catalyzes non-profit and for-profit entities that include Lutheran World Relief, CGA Technologies, Ground Up Investing, and LWR Farmers Market Coffee in addition to IMA World Health. Alongside communities and local partners in fragile settings, our dedicated experts across our organizations integrate disciplines, approaches, and resources to overcome global health challenges, develop productive and stable economies, improve resilience in the face of climate change, and respond to natural disasters and humanitarian crises.

Addressing the challenges for food traceability systems¹ in supply chains is increasing, especially shifting from simple non-digital food traceability systems (FTS) to incorporating the use of automated FTS to blockchain digital FTS, with the aim to better test product quality, trace issues back to source of origin, and ensure food safety along the supply chain (USAID Feed the Future 2021). Coupled with strengthening the regulatory and management systems for governments, value chains, and market actors in the food system, satisfactory progress in food security and safety may be underway through interventions funded by the U.S. Agency for International Development (USAID) and other donors.

This paper is made possible from funding through the [Agribusiness Market Ecosystem Alliance \(AMEA\)](#)² network who supports members and stakeholders in their efforts to build a cost-effective system for delivering services to farmer organizations. AMEA's Toolbox contains peer-approved assessment tools and training and coaching curricula of members in the network. Corus International is adding to this Toolbox by writing this Food Safety White Paper to provide a synopsis of information on the food safety and sanitary issues that a farmer organization faces. Corus is also designing a food safety budget tool to help farmer organizations' ability to cost out and plan steps to enhance their professionalism and meet food safety standards for their buyers and consumers. Over a six-month period from September 2021 – March 2022, the Corus team researched hundreds of international and national regulations and reports in the food safety sector and met with more than 10 staff of international and national organizations and US universities working in this space. Over this process, Corus learned that a food safety budget tool is not available and that there is a great deal of interest in one being developed for development practitioners to use in projects and for farmer organizations to have to plan costs for adhering to food safety of their food products. Corus envisions this tool as an educational instrument for farmers as well as a leverage device for farmers to gain resources to implement food safety practices.

- 1 Product traceability is the ability to identify a product at any stage in the supply chain. A traceability system is the ability of the system to trace the history, application, or location of an entity by means of recorded identifications.
- 2 The Agribusiness Market Ecosystem Alliance (AMEA) is a global network for accelerating the professionalization of farmer organizations. AMEA is one of the fastest-growing networks in the agricultural sector and includes private and public organizations. AMEA has 22 members and nine strategic partners dedicated to accelerating the development of professional farmer organizations. Their vision is a future where there are millions of professional farmer organizations that have access to finance and markets, which enables them to deliver significant benefits to their members. This vision is one of inclusive growth and development.



Understanding the Context

Food safety³ issues are receiving growing importance, recognition, and programming attention. Countries are shifting focus to better understand and plan for food safety and quality protocols that minimize health risks for their populations by creating and using an enabling regulatory ecosystem, identifying the right incentives to effect behavior change along the supply chain, and encouraging improved practices among market actors through training and technical assistance to adhere to food safety standards and acquire certifications⁴. Furthermore, the COVID-19 pandemic highlights the need for food safety and continues to expose the deep inequalities in society and food systems globally.

With the aim to foster consumer demand and confidence in food safety in supply chains, numerous international trade regimes require sanitary and phytosanitary systems and standards to be in place. Smallholder farmers, farmer organizations, buyers, and governments of developing countries scramble to adjust and meet these phytosanitary standards or risk export shipment rejections. External systems force developing country governments to make strategic choices to establish domestic standards and upgrading infrastructure and the knowledgebase of smallholder farmers (Humphrey 2017).

The global food system (from farm inputs to consumers) emits 34 percent of global anthropogenic greenhouse gases (GHG), contributes to tropical deforestation, and is the main drivers of land degradation and desertification, water scarcity, and biodiversity decline (Crippa, et al. 2021). Development of food systems tends to emphasize food production and harvesting, food, loss, and waste, as well as zoonotic diseases (et al) but not how the sanitary system relates to food safety within the food system. The use of indicators to track foodborne diseases are not updated or are missing comparative baselines. Risk assessment tools are needed to drive change in food safety policy and standards and to optimize surveillance, detection, and early warning systems of zoonotic diseases for both the formal and informal sector and crop diseases (Oria and Wallace 2010). Modernizing our food safety and biosecurity risk management systems is an integral part of food system transformation. It requires a science- and risk-based approach for production of safe food

within a food systems approach.

The professionalism of farmer organizations, as defined through [IWA 29](#), focuses on the strategic planning, governance structures, business acumen, ability to raise finance, and to market and sell produce in local, regional, and international markets but misses the importance of food safety. Farmer organizations (FO) receive significant training in good agricultural practices, harvesting and post-harvest handling, techniques, and practices, and are well trained in the correct use of agro-chemicals and pesticides through donor projects, the drying of grains or legumes to avoid diseases (e.g., aflatoxin), or proper cleaning, sorting, grading, and processing practices.

Frameworks exist to assess processor and enterprise facilities and practices to identify non-conformities to international standards and align technical assistance in best practices on proper food safety, such as through the Global Food Safety Initiative's (GFSI) bench-marked food safety certifications and International Finance Cooperation (IFC) Food Safety Kit. Corus industry interviews⁵ show most farmer organizations and enterprises in Sub-Saharan Africa, Latin America, the Middle East, and Asia have limited to zero capacity or knowledge of how to map out the costs to have food safety or sanitary systems in their businesses. Neither do they know how to evaluate the cost-benefit analysis of upgrading existing systems to meet national and/or export standards. A budget tool will allow farmers to not only better understand food safety and what food safety entails, but a budget tool can lay out costs of upgrading food safety systems. This knowledge not only better prepares farmers to participate in the national and international markets fully and confidently, but knowledge on personalized food safety costs allows the farmers to better plan out business plans and operational costs, leverage funding, and so on.

This White Paper is a cross walk of the various tools in existence. It determines and highlights where and how food safety and sanitary systems are incorporated and what currently exists; it shares key findings and recommendations with AMEA network members and other interested stakeholders in the sector regarding food safety and sanitary systems and how these standards coincide with farmer organizations.

³ Food safety is the totality of systems, processes, and practices in the production, processing, and packaging/storage of food for human consumption that ensure adequate hygiene, preservation, and quality from procedure to end consumer.

⁴ While the focus of this paper is food safety and human health risks, we acknowledge the ecosystem benefits that come from food safety choices.

⁵ In August/September 2021 and January/February 2022, Corus met with SCOPEinsight, CNFA, IFC, Rikolto, ACDI/VOCA, Agriterro, and the University of Purdue/Cornell University.

Problem Definition

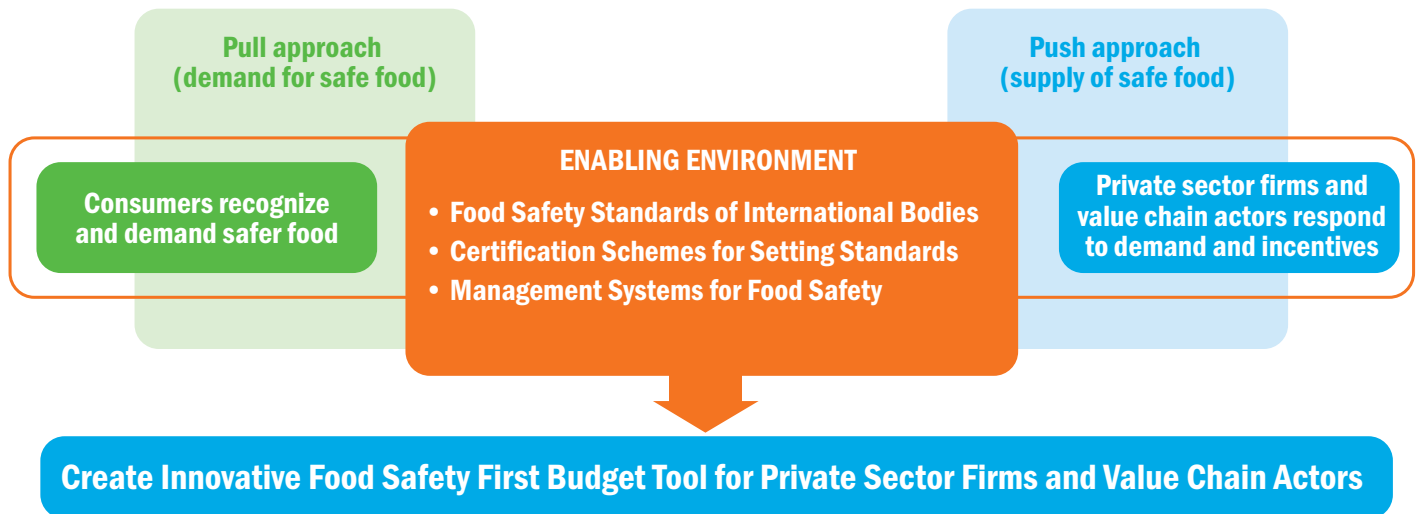
“Foodborne illnesses in South Asia, Southeast Asia, and Sub-Saharan Africa account for 41 percent of the global population but are afflicted with 53 percent of all foodborne illness, and 75 percent of related deaths. In economic terms using 2016 income data, illness, disability, and premature deaths induced by unsafe food led to productivity losses of about US\$95 billion in low- and middle-income countries.” Without food safety standards in place, there will be an increase in the numbers of foodborne diseases, resulting in greater demand for medical care in countries that are already resource-poor and have limited medical facilities. Unsafe food can be avoided through practical and often low-cost behavior and infrastructure changes at points along the food supply chain. Sustained investments in prevention are needed to build countries’ governments and

producers competency to manage food safety risks and act responsibly to mitigate them (Jaffee, Henson, et al. 2019).

Consumers in developing countries are unaware or unable to recognize safer food; for example, pesticide residue will not appear on a vegetable. Value chain actors are not yet expected to supply safe food domestically, and there are few incentives to push forward compliance for food safety standards. As seen in our Theory of Change below, the enabling environment is the pivotal link between these pull and push approaches, recognizing the various international and national standards, certifications, and management systems that strive to have food safety in farmer organizations and other value chain actors. The challenge faced is that farmer organizations and enterprises do not have any means to plan or budget for food safety.

Theory of Change

In reducing the foodborne disease burden and professionalizing the informal sector, appropriate food safety will be achieved.



Food Contamination and Its Complexities

KEY FINDINGS

- Food contamination can occur at any stage of production, processing, or distribution.
- Food contamination in highly industrialized countries of the USA or Europe receives immediate attention with systems and structures in place to recall produce from the supermarket and distribution supply chain, which is not the case in non-industrialized or developing countries.
- Food safety is affected by its environment, increased scrutiny of food contamination, and new and emerging bacteria.
- No single design of Food Traceability Systems (FTS) can be considered the best solution; it always depends on the context.
- Size and complexity of supply chains can exacerbate food safety and sanitary system problems.

The FAO and the Centers for Disease Control and Prevention lists several factors that contribute to and influence the impact of foodborne pathogens on food systems. Climate change in temperature, precipitation, and other environmental factors affect foodborne pathogens and parasites and can expose populations to food safety hazards which affects food safety: “Changes in food production and supply, changes in the environment leading to food contamination, better detection of multistate outbreaks, new and emerging bacteria, toxins, and antibiotic resistance, changes in consumer preferences and habits, and changes in the tests that diagnose foodborne illness” (Centers for Disease Control and Prevention 2020) (Whitworth 2020). With these general, big picture challenges facing food safety, it increases the food safety problems that smallholder farmers in developing countries must handle in their production, post-harvesting handling, storage, and sales.

Farmer organizations and enterprises also underestimate the amount of knowledge, time, expertise, and money that is required to meet food safety standards and sanitary systems in their agricultural production system, trade, and sales. Food contamination can occur at any stage of production: raising of an animal, slaughter of an animal, crop growing, harvest, and post-harvest. The food processing stages of washing, sorting, trimming, slicing, shredding, milling, pasteurizing, chopping, drying, grinding, smoking, cooking, or freezing is where most of the food safety and sanitary systems are critical for an enterprise. Similarly in meat processing practices, contamination of microbial germs can be prolific – occurring at both state and private operated slaughterhouses, meat processing factories, or at the households conducting backyard slaughtering of animals for household consumption. The distribution and transportation

to the consumer at a local market, supermarket, or export market can contaminate food through inferior quality and unreliable energy resources, e.g., cold chain facilities at ports of airports, or incorrectly handled, e.g., meat products stored and transported with vegetables. Water and ice packs to keep products such as fish fresh can also become contaminated through unclean water/ice.

Food Safety in the Broader Global Context

KEY FINDINGS

- In developing countries, food safety attracts attention when an export trade or market access issue occurs.
- There is a lack of adoption of policy and protocols, energy, and infrastructure investment to address food safety issues in developing countries.

Domestic food safety issues in the USA, Europe, Japan, and other countries with strong food safety systems tend to appear on national radar screens only during crises. For instance, in the USA in 2021, there have been 14 different foodborne outbreaks under investigation among vegetables, fish, and poultry (Beach 2021). However, in developing countries, a tremendous need and concerted effort with public and private sector investments in infrastructure is needed to ensure foodborne crisis are detected in the agribusiness and food processing sectors (Jaffee, Economic case for investments in food safety 2019). “For many developing countries, food safety has attracted policy attention primarily as a trade and market access issue, while domestic food safety has received very little strategic or policy attention and only modest resources for investment” (Jaffee, Economic case for investments in food safety 2019).

For developing countries there is an underinvestment in food safety infrastructure, trained human resources, lack of awareness, and little to no enforceable regulations and networks of institutions, unless regarding the segments of cash crops or products that make it to export (Jaffee, Economic case for investments in food safety 2019). Similarly, there is limited attention and effort geared towards consumer awareness of food safety, a lack of which does not create a pull factor for safer and higher quality foods. Local and provincial level agricultural markets, washing and processing stations, and processor storage infrastructure lack many of the rudimentary necessities to meet domestic, regional, and international standards.

Food Safety at the Enterprise and Smallholder Farmer Levels

KEY FINDINGS

- Smallholder farmers' livelihoods depend on market access.
- Market access increasingly depends on food safety.
- Smallholder farmers do not understand food safety issues or do not have the resources to uphold food safety standards.

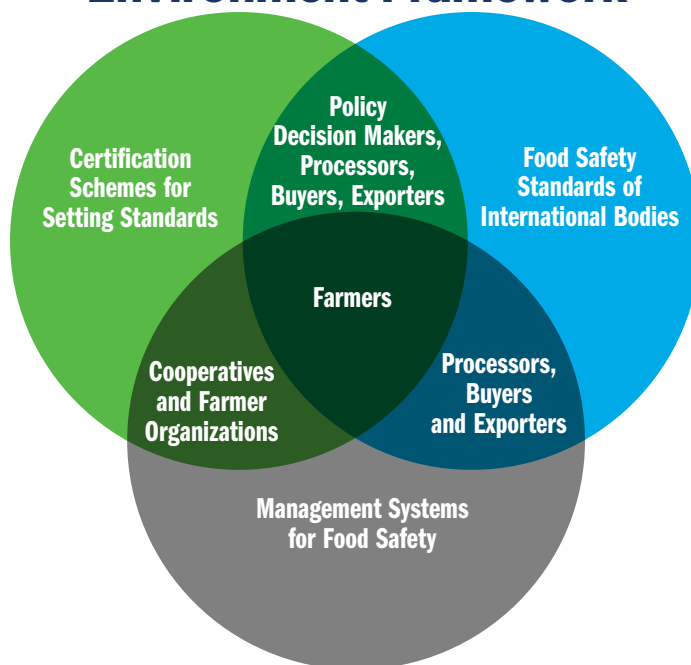
Improving the livelihoods of smallholder farmers depends on the extent to which they can sell their products. However, with food safety becoming increasingly important, “smallholder farmers fail to benefit from market opportunities because they are unable to sell their produce to a range of markets where food safety is an increasingly important issue” (Humphrey 2017). Farmers are not able to uphold food safety standards, and this excludes them from growing markets. This problem stems from lack of resources, knowledge, and awareness; in a survey completed by USAID EatSafe project in the Kebbi State of Nigeria, “[a] majority of respondents (83.6%) stated that financial resources pose the greatest challenge, which was followed by training needs on food safety (75%)” (Okoruwa and Onuigbo-Chatta 2020).

USAID PROGRAMMING IN FOOD SAFETY

[Feed the Future's EatSafe: Evidence and Action Towards Safe, Nutritious Food](#) project aims to create improvements in the safety of foods in traditional markets by focusing on the consumer. EatSafe works to increase knowledge of food safety not only for local consumers, but for development actors. EatSafe works closely with consumers, vendors, and other market actors in traditional food markets; EatSafe directly works to understand food safety risks for farmer organizations and enterprises. [Feed the Future's Enabling Environment for Food Security Project](#) provided analytical services to USAID and its Missions, and built the evidence base for interventions in ag market systems. [The Feed the Future Innovation Lab for Food Safety](#) works to create awareness of food safety, enhance the capacity for food safety research, develop food safety policies, and accelerate research technologies. The Food Safety Innovation Lab works to better inform national standards and policies around good safety through research at the local levels.

Existing Standards to Manage Food Safety

Food Safety Enabling Environment Framework



Based on the existing standards, an enabling environment needs to be created for farmers that pulls together the various components of food safety functions – of international bodies' food safety standards, the management systems a farmer or enterprise must put in place to meet food safety, and the role of certification schemes at the production and buying stages in food safety. These elements outline how the existing standards create an enabling environment for farmers to play a role in safe food. The incentives and decisions that farmers, cooperatives and farmer organizations, processors, buyers, and exporters choose to adopt depend on national laws and regulations (rules adopted by governments in advance of public interests); international trade regimes (rules adopted by governments to engage in the international trading system); international guidelines (principles adopted by various public and private interests); and voluntary standards (rules adopted by buyers and industry networks to control their supply chain and deliver customers what they demand). See the graphic for a visual representation of the Food Safety Enabling Environment Framework.

International Bodies' Food Safety Standards

KEY FINDINGS

- International standards exist, including the World Trade Organization's Agreement in the Application of Sanitary and Phytosanitary Measures and the Codex Alimentarius.
- Laws shape traceability requirements, e.g., the U.S. Food and Drug Administration Food Safety Modernization Act or European Food Safety Authority.
- Depending on the country's national government requirements, food safety standards are recognized and sometimes enforced.
- Developing countries struggle to abide by internationally recognized food safety standards.
- The effectiveness of sanitary and phytosanitary standards systems is dependent upon the technical expertise of its human resources and the adequacy of its physical infrastructure.

International bodies, governments, and some private sector buyers abide by a common point of view to prepare and design protocols, regulations, standards, and certificates for others' adherence to, as listed in Table 1.

The literature on the impact of regional trade agreements on smallholder farmers is limited, but the impacts of regional trade agreements on smallholder farmers is decidedly challenging. For products most affected by food safety issues – fresh produce, fish, meat, and dairy – there is a lot of informal and unrecorded cross-border trade. The promotion and opportunities for regional integration and trade is increasing, and an important part of the process is the reduction in non-tariff barriers to free up trade and competitiveness.

Regional integration will provide opportunities for smallholder farmers to increase their incomes from improved supplies of inputs and more opportunities to sell their produce without the burden of high transport costs, poor storage facilities, arbitrary charges, border delays, and complex sanitary and phytosanitary standards procedures. The challenge is to achieve the goal of maintaining public health and food safety while at the same time creating an environment that does not present obstacles for smallholder farmers.

**See Next Page
for TABLE 1:
International Bodies'
Food Safety Standards**

TABLE 1: International Bodies' Food Safety Standards

STANDARD NAME	PURPOSE	IMPLICATIONS FOR FARMER ORGANIZATIONS (FO) AND SMALL AND MEDIUM ENTERPRISES (SME)
<u>World Trade Organization Agreement in the Application of Sanitary and Phytosanitary Measures (SPS Agreement)</u>	An international treaty that aims to protect human, animal, and/or plant life from certain risks associated with food safety.	Recognizes the difficulty developing country Members may encounter in complying with sanitary or phytosanitary measures of importing Members, and consequently in access to market.
<u>Codex Alimentarius Commission</u>	Harmonizes international food safety standards and ensures fair practices in food trade. Provides a neutral forum for discussion on food safety and related topics.	High level impact at the government-to-government level. FOs and SMEs have minimal awareness of the specific details or impact Codex has on their operations and business.
<u>International Organization for Standardization (ISO)</u>	An independent, non-governmental international organization with a membership of 165 national standards bodies including a quality management standard.	Links with FOs and SMEs as it relates to various standards and certifications, see Table 2.
<u>International Finance Corporation's Global Food Safety Advisory Program</u>	Offers high-quality professional services to help companies apply international food safety standards and adapt sustainable business models. Includes food safety assessments, staff training, and guidance attaining international certification.	Provides direct training to FOs and SMEs, offers guidance and support on preparation for assessments and certification.
<u>Sanitary and Phytosanitary (SPS) Policy Framework for Africa</u>	Supports AU Member States and Regional Economic Communities (RECs) in achieving their trade goals in the context of protecting plant, animal health, and food safety and contributes to the Malabo goal of boosting intra-Africa and global trade.	Emphasis on the government-to-government level policy and regulatory framework. FOs and SMEs lack awareness of the SPS policy framework for Africa or the implications it has on their day-to-day operations.
<u>African Continental Free Trade Area (AfCFTA)</u>	Aims to accelerate intra-African trade and boost Africa's trading position in the global market by strengthening Africa's common voice and policy space in global trade negotiations. As of 5 February 2021, 36 countries have deposited their instruments of ratification, 36 countries have ratified the AfCFTA agreement.	Offers African producers, processors, and enterprises the opportunity of a single, liberalized market for goods and services through successive rounds of negotiations. Promotes industrial development through diversification and regional value chain development.
<u>Association of Southeast Asian Countries' (ASEAN) Food Safety Regulatory Framework</u>	Provides a coherent and integrated approach and links the initiatives in new legal frameworks, closing gaps and ensuring that food safety is implemented across the food chain. Builds upon the existing commitments to provide a structure and the instruments to realize the free flow of safe food in the region.	SMEs that are exporting crops and products, such as mangoes, aquaculture, and crustaceans, and coffee, cocoa, and coconut will understand well the ASEAN food safety regulatory framework. Sets clear guidelines and notifies SMEs on food safety standards for export market including the differing MRL requirements per country. FOs are less knowledgeable unless organized into large entities.
<u>Caribbean Community's (CARICOM) Caribbean Agricultural Health and Food Safety Agency</u>	Regional and national support in establishing, managing, and operating national agricultural health and food safety systems in accordance with the Sanitary and Phytosanitary (SPS) Agreement.	Like ASEAN, IOFS/OIC and SPS Policy Framework for Africa, provides guidance to SMEs and large FOs on the correct food safety and SPS standards required for the export market.
<u>Organization of Islamic Cooperation's International Islamic Organization for Food Security</u>	Ensures sustainable food security in OIC countries through socio-economic development and systemic promotion of targeted programs related to agriculture, science, and technology, humanitarian aid, trade, and food export to IOFS/OIC countries.	Like ASEAN, CARICOM and SPS Policy Framework for Africa, provides guidance to SMEs and large FOs on the correct food safety and SPS standards required for the export market primarily.
<u>European Union's Food Safety Authority Legislation</u>	EU countries implement these harmonized standards and establish controls to enforce them. The EU audits the application and effectiveness of the laws and controls and provides training to the responsible EU and international authorities.	Stringent and cohesive regulations and standards that apply to imports into European Union member countries from anywhere in the world. FOs and SMEs with food safety standards and certifications in place can supply to the EU market.
<u>United States Food Safety and Inspection Service (FSIS) Policy</u>	Housed in the USDA, ensures that rules and regulations are transparent, and science based, provides opportunities for the food safety community to participate in the rule-making process, informs and establishes accountability through published regulations, notices and directives, agency initiatives, supporting research and associated industry guidelines.	Informs US farmers and importers of standard requirements. Encompasses federal inspection acts in the meat, poultry, and egg sectors in addition to humane methods of slaughter.

Farmer organizations and firms operating in developing countries that export commodity or food products out of the country will have a better understanding of standards due to the export approvals processes. Those that sell locally or nationally are less likely to know what sanitary and phytosanitary standards are necessary for food safety.

Management Systems for Food Safety

KEY FINDINGS

- Internationally recognized management systems for food safety cover the entirety of commodity supply chains.
- Often agribusiness processing companies in developing countries ensure their operations have Hazard Analysis and Critical Control Points (HACCP) and Good Management Practices (GMP) trained staff, whereas farmer organizations and local enterprises have not.
- Export supply chains must adhere to stringent food safety inclusive of sanitary systems set by the importing country.
- Government supervision of the food system through standards can reduce food safety risks and improve governance of food systems at low costs to government and consumers.
- Food traceability is a record-keeping instrument that follows food through all processes from producer to business to consumer. It cannot improve food safety by itself but contributes to food safety management system efficiency and facilitates identification of a food safety event such as a bacterial outbreak or contamination.

The onus of responsibility for keeping food safe depends on the supply chain systems and market actors that are operating in the supply chain. We refer to the safety of these as management systems. Delivering safe food to the end consumer is the culmination of the work of many people.

Leaders in this sector have an opportunity for food businesses and experts, inclusive of food processors in developing countries, to upgrade food safety systems using the [IFC Food Safety Toolkit](#). It can also be linked to GAP and GMP training to increase farmer awareness building and education level in food safety issues, especially as the modules are already summarized and can be adapted to plug in the food safety angle.

Producers, shippers, processors, distributors, handlers, and numerous others perform actions every day that may affect the safety of our food. Regulatory food inspection programs in low- and middle-income countries can help control foodborne illnesses. These food inspection programs are often overseen by the main parties responsible for food legislation – a country's ministries, a country's departments of agriculture, health and trade, industry actors. These inspection programs regulate safety and quality of agriculture and animal products through various product standards and acts around disease control, fertilizer use, meat safety or veterinary, and genetically modified organisms. The 2001 Food and Drug Administration Food Code states the implementation of HACCP at retail should be a voluntary effort by industry in the USA but requires the entity consult the authority to see if having a HACCP plan is necessary.

The focus is on processing, food service industries and retail sector around food safety performance standards, and these are primarily for industrialized countries. In low- and middle-income countries, these systems are not as well established but are starting to emerge driven by a desire to export agricultural products.

**See Next Page
for TABLE 2:
Management Systems
for Food Safety**

TABLE 2: Management Systems for Food Safety

MANAGEMENT SYSTEM NAME	PURPOSE	IMPLICATIONS FOR FARMER ORGANIZATIONS (FO) AND SMALL AND MEDIUM ENTERPRISES (SME)
<u>ISO 9000 Family</u>	Seeks to improve the quality of [organizations] products and services and consistently meet their customers' expectations [through] various aspects of quality management but not food safety. Food safety is part of quality characteristics for food products and is considered.	FO and SME raise the standard of their management systems especially in processing sectors that can meet food safety and sanitary systems. It can expand FOs markets to include export markets with SPS and MRL standards.
<u>Food Safety System Certification (FSSC) 22000</u>	Used to audit and certify the food systems of food chain organizations which process or manufacture: perishable animal and vegetable products, products with a long shelf life at ambient temperature, (bio)chemical manufacturers (of food ingredients such as vitamins, additives, and bio-cultures), although excluding technical and technological aids, and food packaging.	Like ISO 9000 Family of certificates, higher sophisticated FOs and SMEs with processing systems, cold chain and chilled storage facilities and organized systems for value-added products would require FSSC. An example might be dairy processors and meat factories.
<u>PrimusGFS</u>	A GFSI recognized audit scheme for the certification of produce sector products – from growing operations to minimally-processed (fresh-cut) produce products.	Like FSSC 22000, GMP and ISO 9000. Requires a higher level of sophistication at the FO or SME level.
<u>Global Seafood Alliance (GSA) Seafood Standard</u>	An international, non-profit trade association dedicated to advancing environmentally and socially responsible aquaculture. The Alliance develops Best Aquaculture Practices (BAP) certification standards. These cover aquaculture facilities (hatchery and feed mill to farm and processing plants) producing shrimp, salmon, tilapia, channel catfish, and pangasius.	FO and SMEs follow GSA Seafood Standards to ensure the safe and sustainable harvest of aquaculture, its operations, processing facility, and cold or chilled storage facility.
<u>GMP+ Feed Certification Scheme</u>	Defines conditions relating to production facilities of feed, storage, transport, staff, procedures, documentation, and more.	Like FSSC, ISO9000 and HACCP, this is geared to FOs and SMEs that have sophisticated supply chain systems, have a reasonable level of infrastructure and external investment, and organized and reliable product sales.
<u>Hazard Analysis and Critical Control Points (HACCP)</u>	A management system in which food safety is addressed through the analysis and control of biological, chemical, and physical hazards from raw material production, procurement, and handling, to manufacturing, distribution, and consumption of the finished product.	Like FSSC, ISO9000 and GMP+Feed Certification Scheme SMEs (processors) have established management structures in place to operate at a sophisticated and reliable level of processing.
<u>GMP or Good Manufacturing Practices</u>	Recommends best practices in a matter relating to, “personal hygienic practices, design and construction of a food plant and maintenance of plant grounds, plant equipment, sanitary operations, facility sanitation, and production and process controls during the production of food.”	More applicable to FOs and small enterprises that are starting to develop food safety standards and management practices to meet safe food requirements.
<u>USDA's GAP or Good Agricultural Practices</u>	Verifies that fruits and vegetables are produced, packed, handled, and stored to minimize risks of microbial food safety hazards. Verifies adherence to recommendations and industry recognized food safety practices.	Directly applicable to FOs that are following practices to ensure pesticide residues are not in harvested crop and products, the correct application of pesticides, and use of good agricultural practices as determined by the entity issuing the training and certificate.
<u>Global Food Safety Initiative Benchmarking</u>	GFSI brings together food safety experts to identify the best management practices for promoting food safety throughout the industry. Certification programs that meet the GFSI performance thresholds are said to be “GFSI-Recognized.” The GFSI Benchmarking Requirements for Certification to demonstrate their competence to the food safety certification eco-system through a single registration “once certified, accepted everywhere” approach. Over 29,000 stakeholders follow GFSI around the world. It is the largest global network of the consumer goods industry. Influencers include large multinational companies of Walmart, Costco, Coca-Cola, Tyson, Cargill, Dole, Nestlé, Amazon, etc.	SMEs carry out GFSI -recognized certification process involves 6 steps – scope, contact, assess, prepare, audit and maintenance. Opens FO opportunities for global standards and supply to multinational and international markets.

Setting Standards Through Certification Schemes

KEY FINDINGS

- The Global Food Safety Initiative (GFSI) is a capacity building tool that can assist processors to understand the status of their facilities and practices in food safety.
- Certification programs include standard requirements for food safety management systems and governance rules for the certification process.
- There are more than nine certification programs for food safety management systems in the world. One well-known certification program for farmers that covers food safety requirements is GLOBALG.A.P.
- Certifications can be consumer and/or buyer driven and are centered around their concerns.
- Certifications may or may not adhere to international food safety standards or management systems.
- Many certification standards do not explicitly address food safety. There is even less focus on sanitary systems. Many of the requirements include criteria that relate to food safety (i.e., traceability, worker health and safety, pest management, chemical management, storage, or transportation).
- There is an inconsistency of requirements to be certified; farmers and agribusinesses must stay abreast of changes to certifications and quickly adapt.
- The costs and duration of certification varies by type.
- Farmers organizations and enterprises pursue certifications without fully understanding the implications on business cost.

Of the many certification standards studied for this White Paper, and there are others that exist globally, these ranged from food industry management standards across to agricultural commodity production, harvesting and processing standards, as well as environmental sustainability standards.

There is not a demand or requirement for producers to acquire these certifications but if a buyer or exporter can meet standards and certifications are proof of the standard, the end consumer is assured that the product food quality or sourcing practice has followed a food safety standard. Not all

certifications are concerned with the food safety standards of a product. Other factors such as satisfying an ethical standard a consumer cares deeply about is driving certifications the farmers can pursue. This might include incorporating social certification schemes such as child-free labor of chocolate companies that have FairTrade certification or use [SEDEX](#), an online platform for companies to manage and improve working conditions in global supply chains to help companies improve their responsible and sustainable business practices and source responsibly. Farmers can become confused with the different certifications and standards that exist in their industry; selecting which are viable from a business perspective is challenging for farmers.

Table 3 lists 10 food safety and socially driven certifications in existence and used by farmers today. Some are more commonly known by smallholder farmers in low- and middle-income countries than others, e.g., GlobalG.A.P., Organic certified, FairTrade, or Rainforest Alliance. Others are less known, e.g., BioTrade Standard. The table highlights which aspects of the certification is concerned with food safety that the farmer would need to take note of in their farming and farm-based processing practices that would impact their business costs. In the table, red indicates that the certification does not list a certain food safety aspect in their scheme. Yellow indicates that the certification touches on a certain food safety aspect. Green indicates that the certification fully encompasses and expects a certain food safety aspect.

See Next Page
for **TABLE 3:**
**Certification Schemes
and Criteria Requirements
for Food Safety
and Quality**

KEY:

-  Certification does not list a certain food safety aspect in their scheme
-  Certification fully encompasses and expects a certain food safety aspect
-  Certification touches on a certain food safety aspect



TABLE 3: Certification Schemes and Criteria Requirements for Food Safety and Quality

CERTIFICATION NAME	GLOBALG.A.P.	GLOBAL FOOD SAFETY INITIATIVE BENCHMARKING REQUIREMENTS	ORGANIC CERTIFIED	FAIRTRADE (FOR SMALL-SCALE PRODUCER ORGANIZATIONS)	RAINFOREST ALLIANCE SUSTAINABLE AGRICULTURE STANDARD FARM REQUIREMENTS	COMMON CODE FOR THE COFFEE COMMUNITY (4C)	ETHICAL BIOTRADE STANDARD	HUMANE FARM ANIMAL CARE	THE WILDLIFE FRIENDLY ENTERPRISE NETWORK	BIODYNAMIC FARM STANDARD
CERTIFICATION PURPOSE	Aims to create solutions for safe, socially, and environmentally responsible farming practices – consists of over 40 additional standards	Recognizes a number of certification programs that meet food safety and business efficiency criteria	Aims to foster the cycling of resources, promote ecological balance, and conserve biodiversity	Aims to enable farmers and workers to have more control over their lives and decide how to invest in their future	Aims to create a framework for sustainable agriculture	Aims to anchor sustainability in coffee supply chains	Aims to set good practices for how companies and their suppliers source ingredients from biodiversity	Aims to improve the lives of farm animals in food production from birth through slaughter	Aims to contribute to wildlife conservation around the world	Aims to transform the practice & culture of agriculture to renew the vitality of the earth, integrity of our food, & the health and wholesomeness of communities
IMPLICATIONS OF FOOD SAFETY INCLUDES										
Contains no specific mention of food safety or sanitary systems										
Agrochemicals usage (weed control)										
Pest management										
Post-harvest practices										
Water treatment										
Clean, adequate storage areas										
Product traceability										
Handwashing facilities										
Waste management										
Worker, health, and safety standards										
Good Management Practices										
Touches on transportation and storage practices										
Record keeping practices										
Clarity on costs to farmer or enterprise	License fees EU1 - 130 + costs related to production area		USD\$1,200/ farm				Varies based on annual revenue, product, and other standards			USD\$460 (first year); USD\$420 (after)
Duration of certificate before renewal	1 year	Annual monitoring	3 years	3 years	3 years	3 years	3 years	1 year	1 year	1 year

Food Safety Culture

KEY FINDINGS

- Smallholder farmers do not fully understand the impact their role has on food safety.
- Food safety culture is a commitment and investment made by the smallholder farmer and agribusinesses (food operators, aggregators, processors, retailers) for all food sectors.
- Literature shows conclusively that the costs and capability requirements of preventive standards are considerable for independent smallholder farmers but lessened through the development of collective organizations among farmers.

An enterprise's food safety program is a means to identify and correct non-compliance while a food safety culture is a means to identify and recognize proper behavior and look to reinforce this positivity in the enterprise.

The Global Food Safety Initiative (GFSI), an industry-driven global collaboration dedicated to advancing

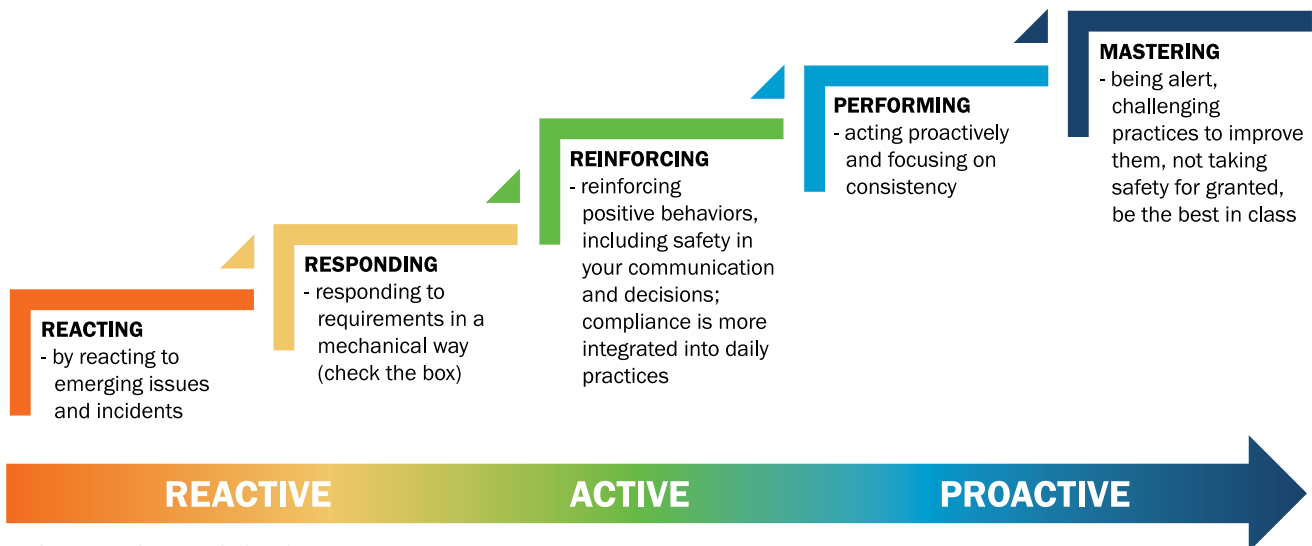
Global Food Safety Initiative (GFSI) defines food safety culture as the shared values, beliefs, and norms that affect mindset and behavior toward food safety in, across, and throughout an organization.

food safety, states that, "Every enterprise that is a part of today's global food industry from the smallest roadside vendor to the largest multinational corporation, follows some degree of safe food handling practices. These practices have kept, and continue to keep, most of the world's food supply safe for human consumption. An increasingly complex and fragmented food delivery system demands more than a reliance on written rules, regulatory oversight, and safe food practices" (Global Food Safety Initiative 2018).

The [NSF](#) graph below shows the different learning levels that occur with people as they develop food safety culture maturity. Unfortunately, the smallholder farmer is often the lowest-level users of food safety practices and culture. Instilling food safety culture with them first is an excellent method for bringing positive behavior change. The GLOBALG.A.P. is a useful tool in

creating and fostering food safety culture; it is a useful instrument for increasing food safety within farmer organizations. In Kenya, Twiga Food Kenya received GLOBALG.A.P. status and this had a profound impact on the food safety and food safety culture of their company thus helping to build their business and status in the food supply chain.

NSF FOOD SAFETY CULTURE MATURITY LEVELS



Reference: NSF Food Safety Culture Maturity Model

Agribusiness enterprises that have heard of, and adopt a food safety culture, are taking the first steps towards addressing food safety issues. However, where there is no knowledge or education of food safety or no order of process for food safety, many businesses wait for government intervention which tends to be slow. There is an idea that food safety must start as a want or need from the consumer, leaving the onus of food safety on no one.

Solution Details

KEY FINDINGS

- Knowledge and resources are key to upgrading smallholder farmers' and agribusiness enterprises' ability to address food safety.
- There is a lack of guidance, tools, or templates to plan for the costs associated with meeting certification scheme requirements or international bodies and management food safety standards.
- There is an economic case for investments in food safety but may not be widely understood.
- There is a need for food market infrastructure: national programs for food safety science and technology, food safety education and professional training, consumer awareness, SME quality management benchmarking and upgrading, laboratory testing, and other areas.
- There is currently no costing guidance for market actors to budget for food safety and food safety culture.

Corus sees that the crux of the food safety problem for smallholder farmers and small and medium enterprises as a question of knowledge and resources aligned with industry standards and incentives. The International Fund for Agricultural Development (IFAD) research series report *Food safety, trade, standards and the integration of smallholders into value chains* suggests, "[enable] smallholder farmers to gain knowledge about new food safety requirements, invest in food safety systems and increase the confidence of buyers" (Humphrey 2017).

The safety of food reflects efforts by many stakeholders operating under diverse environmental, infrastructure, and commercial or semi-commercial food market conditions. For

many developing countries, food safety attracts policy attention, without corresponding investments in enforcement, inspection, and general oversight. Governments need to develop strategies to leverage private investment in the national food safety system that are above infrastructure upgrades at the farm, agribusiness, or supply chain level.

Through the preparation of this White Paper, Corus has learned that to date, a guide for enterprises to use to budget and price out the cost of operating food safety standards, a food traceability system, and food safety culture does not exist. Corus proposes a solution to this problem in the creation of a food safety costing tool, hereafter named the Food Safety First Budget Tool (FS-First Budget Tool), for farmer organizations and enterprises, something that is missing from desk research and discussions with organizations active in food safety.

This model and FS-First Budget Tool will allow farmers, farmer organizations, cooperative management, and food operators (processors, aggregators, buyers, etc.) to understand and plan for food safety standards in their operations, and drive investment in food safety. As part of the process of creating the FS-First Budget Tool, Corus will validate whether it can be used:

- For internal management purposes as a tool for farmer organizations and enterprises to determine whether it is profitable to make food safety investments in their operations.
- For financial management purposes as a guide to recognize what costs are beneficial to satisfy consumers and buyers. Along with which certification schemes are valuable to pursue or not, and the associated costs therein.
- For marketing purposes to show the farmer organization, cooperative, or enterprise has an incentive to expand their market outlets, e.g., to urban and formal markets inclusive of exports.
- Used as leverage to engage larger commercial companies and buyers to make investments and diversify their supply chains, who could also use the costing tool for their business engagement.
- Explain the costs needed to adhere to certifications, regulations, and standards can be contradictory and help farmers make informed, selected decisions.

- Reduce risk when accessing finance because a farmer organization, cooperative, or enterprise with a well-established food safety standard and culture will be less risky to loan to, and it will be possible to measure the return on investment of investing in food safety systems through sales.
- The FS-First Budget Tool can be combined with capacity building activities with farmer organizations, cooperatives, and enterprises at the early stages of engagement.
- The FS-First Budget Tool can be used in combination with other business development services (BDS) or enterprise assessments and is not a stand-alone tool but is something that can be incorporated into ongoing private sector engagement.
- Open the prospect to farmers and other market actors changing their behavior and practices around food safety standards and food safety culture, which will benefit consumers and customers, and increase customer demand for healthy sustainable food systems locally and nationally.

Corus recognizes that considerations of food safety are expansive and all encompassing. Any tool that Corus develops will be user-friendly and adaptable to the requirements of the farmer organizations/cooperative that will use it. We further recognize that periodic updates and customization to the national or regional regulatory and policy regime may be necessary.

Conclusion

Food safety standards should be viewed as a continuum with a focus on continuous improvement and upgrading at every stage of the food system. Appropriate and cost-effective food safety

standards can and should be followed by those that are able, and wherever possible should be incorporated into operating costs of any producer or business. However, we recognize that not everyone is able to comply with food safety standards but by raising awareness and providing a framework through which smallholders and cooperatives can consider these dimensions and their related costs, we believe that actors in the food systems can anticipate and hopefully implement progressively high standards of food safety. In turn, we believe that the market will reward these efforts through increased market access and demand for safe food products. Though the USAID Paper, *How Standards Can Improve Agriculture, Food Safety, and Food Security*, states, “Adoption of effective consensus standards can play a key role in helping developing countries enhance agricultural productivity and address food security” (ANSI n.d.). The paper expresses those developing countries are producing and consuming more food outside of the household; therefore, safety standards are important to protect not only the health of the population, but to let these developing countries become strong players in the global economy and likewise increasing the livelihood of these developing countries (ANSI n.d.).

Food safety problems grow as food safety awareness grows – as awareness of food safety increases, buyers increase food safety standards, which then affects developing countries struggle to abide by standards. Developing countries devote resources to food safety for their export cash crops and products, leaving national and local markets behind in the quest to increase food safety. Smallholder farmers then don’t see the need to uphold food safety standards, which then excludes them from larger markets. When that need is seen, however, smallholder farmers lack the resources to maintain the needed food safety standard.

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