

EatSafe: Evidence and Action Towards Safe,  
Nutritious Food

# Food Safety, Traditional Markets, and Consumer Demand in Low- and Middle- Income Countries: A Landscape Synthesis

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*This EatSafe report presents evidence that will help engage market actors and empower consumers to offer and obtain safe nutritious food. It will be used to design and test consumer-centered food safety interventions in informal markets through the EatSafe program.*

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## ACRONYMS AND ABBREVIATIONS

ASF	Animal-source food(s)
EatSafe	Evidence and Action Toward Safe, Nutritious Foods
FBD	Foodborne disease(s)
GAIN	Global Alliance for Improved Nutrition
GAP	Good Agricultural Practice
GHP	Good Hygiene Practices
HACCP	Hazard Analysis and Critical Control Points
LMICs	Low- and middle-income countries
LOC	Locus of control
KAP	Knowledge, attitude, practice
NGO	Non-governmental organization
SBCC	Social and behavior change communications
SOP	Standard operating procedure
USAID	U.S. Agency for International Development
WASH	Water, sanitation, and health
WHO	World Health Organization

## EXECUTIVE SUMMARY

Feed the Future's EatSafe: Evidence and Action toward Safe, Nutritious Food (EatSafe) seeks to improve the safety of nutritious foods bought and sold by millions of people in traditional food markets in low- and middle-income countries (LMICs). Supported by the U.S. Agency for International Development (USAID), EatSafe's formative research gathered existing evidence on the interplay among foodborne diseases, traditional markets, and behavior change.

The scope of this review focused on traditional markets, which provide millions of people with nutrient-rich commodities like animal-source foods and fresh produce. However, these same foods are the leading cause of foodborne disease globally. The research, based on insights from 11 literature reviews, revealed that:

- There is a strong connection between food safety, nutrition, and health. To address these issues, a food systems approach is required.
- Traditional markets are key contributors to local economies and food security but pose significant food safety risks due to inadequate resources related to surveillance, regulation, and infrastructure.
- Consumers and vendors are motivated to improve food safety but face a variety of context-specific internal and external constraints to changing their behavior.
- Practitioners working to improve food safety in traditional markets recommend a comprehensive approach that considers positive behavior change, best practices, appropriate technologies, and an enabling environment.
- Psychosocial and emotional mechanisms are key motivators for positive behavior change. Changes in consumers' and vendors' food safety behaviors can be measured via knowledge, attitudes, and practices (KAPs) models.

Despite the significant consequences of unsafe food, food safety is an often-overlooked component of nutrition and food systems frameworks, even though food safety and nutrition are interlinked through pathways like health, supply chains, and regulation. Context-specific learnings (e.g., gender dynamics) are critical to understanding the factors impacting the various dimensions of improving food safety.

The insights identified in this review were used to design EatSafe's food safety interventions in three markets in Ethiopia and Nigeria. This synthesis brings together EatSafe's formative research on food safety in food systems and insights into food safety concerns specific to traditional markets. Findings reinforce that efforts to mitigate foodborne disease at the market actor level are imperative. These learnings highlight the importance of future investments in traditional markets and give specific attention to how safer foods can improve nutrition outcomes for low- and middle-income populations.

## I. INTRODUCTION

Feed the Future's EatSafe: Evidence and Action Towards Safe, Nutritious Food (EatSafe) seeks to improve the safety of nutritious foods bought and sold in traditional food markets around the world. [Appendix 1](#) contains the program's Theory of Change.

Before initiating fieldwork in Nigeria and Ethiopia, EatSafe completed a formative research phase to identify the global evidence base on the motivations, attitudes, beliefs, and practices that shape people's decision-making related to food safety. Learnings from these activities were foundational inputs to the development and implementation of EatSafe's food safety interventions in traditional markets in Nigeria and Ethiopia.

To fulfill the program's key objective of disseminating and consolidating knowledge on food safety and traditional markets, this report synthesizes key insights from 11 qualitative and quantitative literature reviews completed during the program's global formative research phase from 2021 to 2023 ([Appendix 2](#)). As such, this report is structured by thematic area. This report first examines the relationships between food safety, nutrition, and health in the context of global food systems (Section 2); then, it identifies the characteristics that make traditional markets ideal for food safety interventions, as well as the existing evidence base on improving food safety knowledge, attitudes, and practices (KAPs) among consumers and fresh food vendors (Section 3). Then, it illustrates EatSafe's approach to improved behavior change among consumers and vendors related to food safety in traditional markets (Section 4). This framework encompasses three domains: positive behavior change, best practices and technologies, and an enabling environment. Finally, this report ends with a discussion on implications for other programs seeking to change behaviors and improve food safety KAPs in traditional markets (Section 5).

## 2. FOOD SAFETY AND FOOD SYSTEMS

Across local and global food systems, the concept "unsafe food is not food" is shorthand for how contaminated food cannot provide the nutrients needed to sustain growth, health, and well-being (1,2). EatSafe undertook two activities to explicitly identify how food safety is linked across food systems, and specifically, to nutrition. EatSafe examined several pathways that interlink food safety and nutrition (3–5), as shown in **Table 1**.

**Table 1.** Pathways linking food safety and nutrition in food systems

PATHWAYS LINKING FOOD SAFETY AND NUTRITION
<b>HEALTH, PHYSIOLOGY, HAZARDS, AND FOODBORNE DISEASE BURDEN</b>
<ul style="list-style-type: none"><li>• Both acute and chronic FBD can decrease the body's ability to intake and absorb nutrients, increasing risks for detrimental health outcomes (e.g., undernutrition, diminished growth, particularly among children &lt;5 years, gastrointestinal illnesses, and diseases like cancer.)</li><li>• <i>Direct</i> pathways reflect proven associations between environmental enteropathy, stunting, and mycotoxin exposure, which are well-documented for children &lt;5 years but are not as clear for adults.</li><li>• <i>Indirect</i> pathways are health outcomes impacted by both food safety and nutrition (e.g., diabetes, thyroid disease).</li></ul>
<b>CONSUMERS, SUPPLY CHAIN, AND MARKETS</b>
<ul style="list-style-type: none"><li>• Consumers' food purchasing decisions often involve tradeoffs between cost, quantity, and perceived quality and/or safety, all of which influence nutrient intake; likewise, safer but higher-cost foods may reduce household budgets for other nutritious foods.</li><li>• The time required to use safer preparation practices at home may conflict with caretaking or other necessary and time-consuming activities.</li><li>• Lower quality foods may be diverted to markets serving lower-income consumers.</li></ul>
<b>GOVERNANCE, POLICY, AND REGULATION</b>
<ul style="list-style-type: none"><li>• Standards that ensure safe processing and storage practices throughout the supply chain may improve food safety but could also impact nutrient levels.</li><li>• Appropriate food safety incentives and educational efforts for actors across the food supply chain can support increased demand and supply for safe, nutritious foods.</li></ul>

Sources: EatSafe reports (2–5)

EatSafe also focused on food safety indicators and metrics. Using the three pathway categorizations from **Table 1**, EatSafe examined the availability and utility of food safety data from open-source databases that synthesize data across food systems, like the Global Nutrition Report and the Food Systems Dashboard (6).<sup>1</sup> Though food safety indicators at both the national and international levels are not well represented in the databases (6,7), EatSafe found enough data to recommend eight indicators for further investigation and potential inclusion (**Table 2**).

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<sup>1</sup> Data refers to both indicators and metrics. EatSafe has defined a *metric* as a method used for measuring something (e.g., patient admission sheets) or the variable that is being measured (e.g., number of illness cases is a metric of disease burden), while an *indicator* is a quantitative variable or qualitative factor that measures changes connected to systems or programs.

**Table 2.** Recommended food safety indicators for inclusion in food systems databases

RECOMMENDED INDICATORS FOR INCLUSION IN FOOD SYSTEMS DATABASES
<b>HEALTH, PHYSIOLOGY, HAZARDS, AND FOODBORNE DISEASE BURDEN</b>
<ul style="list-style-type: none"><li>• Food recall alert, early warning, and/or horizon scanning systems, which indicate the level of food safety proactiveness within a national or regional food system; and</li><li>• Epidemiological data collection on foodborne disease burden, which indicates public health readiness for either preventive or response purposes.</li></ul>
<b>CONSUMERS, SUPPLY CHAIN, AND MARKETS</b>
<ul style="list-style-type: none"><li>• Recognized food safety trainings for supply chain actors, which is key to consistent implementation of food safety best practices across the food system;</li><li>• Food testing laboratories, which allow continuous examination of food and clinical specimens;</li><li>• Certified businesses according to existing food safety schemas;</li><li>• Active consumer associations; and</li><li>• Survey data related to consumer perspectives.</li></ul>
<b>GOVERNANCE, POLICY, AND REGULATION</b>
<ul style="list-style-type: none"><li>• The existence of food safety standards (e.g., an active national Codex Alimentarius committee), which can facilitate transparent information exchange and encourage coordination between government agencies and the private sector</li></ul>

Sources: EatSafe reports (6,7)

### 3. FOOD SAFETY AND TRADITIONAL MARKETS

Recent estimates suggest the informal food sector, including street food vending and traditional, also called “open air”/“wet”, markets, serves between 65% and 95% of the domestic market demand for food in LMICs (1,8,9).<sup>2</sup> Traditional markets are dedicated spaces where food is bought and sold for various purposes, playing crucial economic, cultural, and social roles. As the predominant retail destination for nutrient-rich, locally grown fresh foods (i.e., animal-source foods (ASF), fruits, and vegetables), traditional markets fulfill critical food and nutrition. Traditional markets also contribute to local social networks, economic development, and livelihood support, while maintaining competitive pricing across a broad variety of products(10–12).

While being important for nutritious diets, ASFs, and fresh produce are often the leading cause of foodborne disease (FBD) globally (2) and conditions in traditional markets can exacerbate these risks. Recent estimates suggest between 50% and 60% of FBD burden in low- and lower-middle-income countries can be attributable to foods sourced from the informal food sector (9). This reflects inadequate policy, regulation, infrastructure, surveillance, and food tracing systems as compared to the formal food retail sector (1,11).

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<sup>2</sup> By contrast, formal food retail refers to supermarkets and grocery stores, which are characterized by highly standardized and systematized food processing, storage, and distribution regulations (9).



Systems to establish food safety standards or initiate product recalls are generally lacking; requirements for vendor licensure, if they exist, may be inconsistent (1,13). As a result, vendors, market management authorities, and local government actors often lack agency or knowledge about both food safety risks and mitigation strategies (11,12).

Programs like EatSafe are testing market-based, context-specific interventions to improve food safety behaviors among food vendors, handlers, or consumers in traditional markets or community settings; the evidence base is small, but growing (9,14). With outcomes focused on behavior change, programs often focus on outcomes related to improved knowledge, attitudes, and practices (KAPs) about food safety. KAP models divide the process of changing human behaviors into three steps – acquiring knowledge, generating attitudes, and forming and repeating practices (15). The following section of this report synthesizes existing evidence on improved KAPs related to food safety for both consumers and fresh food vendors who buy and sell foods in traditional markets every day.

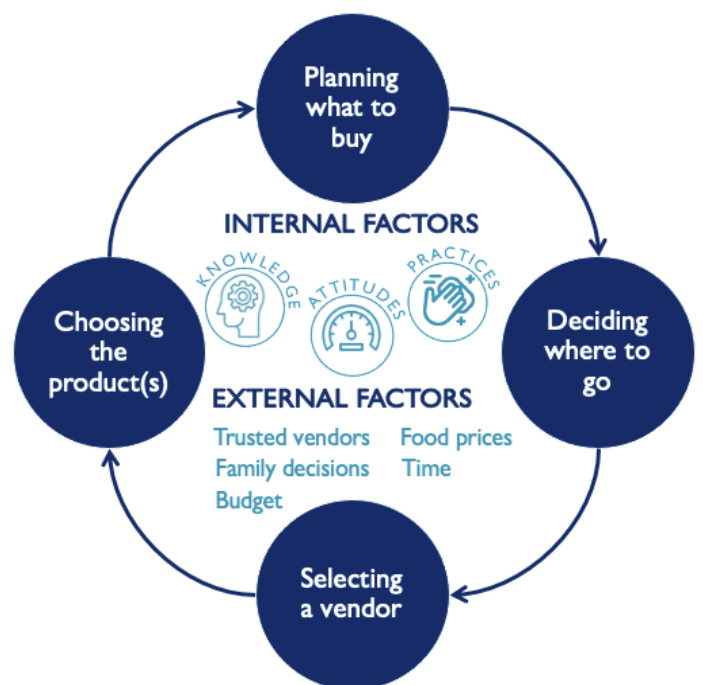
### 3.1. CONSUMERS' FOOD SAFETY KAPS

Most research on consumers' knowledge, attitudes, and practices (KAP) related to food safety has focused on knowledge and practices, rather than attitudes, a gap that EatSafe seeks to fill (16). Overall, consumers appear to approach food safety as a set of practices rather than a calculation of risk (i.e., the perceived losses or gains that one may experience as a result of unsafe food, otherwise known as "risk perception") (16). Most communities around the world have preexisting, culturally specific food safety risk-mitigation practices related to food handling, preparation, and storage (17,18). This specificity emphasizes the importance of context-specific formative research for food safety work.

EatSafe developed a conceptual map of a consumer's steps to purchase food in traditional markets in LMICs (Figure 1; (19)). The conceptual map provides a visual journey for the implicit processes involved. As noted in Figure 1, internal and external factors, including interpersonal relationships with sellers, finances, and importantly, individual food safety KAPs, influence consumers' food purchasing decisions.

Consumers develop a shopping list and begin planning what food to buy (influenced by their needs and what is thought of the food – which might include relative safety). Consumers then decide which market to visit

**Figure 1.** EatSafe's conceptual map of consumer behavior in traditional markets



based on its distance, expected price, and quality of available food. Once at the market, consumers choose which vendor to visit based on the price and quality offered by the competing vendors. Finally, consumers purchase the highest quality foods (i.e., visibly clean, fresh items) within their budget.

Lower-income consumers may prioritize convenience and price over food safety when purchasing food (16). Vendors in traditional markets may lack official food safety certifications given the under-regulated nature of the sector (17). Even when consumers are motivated to select safer food, they may rely on simple cues (e.g., visiting trusted vendors, and buying products without obvious blemishes, flies, or discoloration) to make decisions about food safety (17), rather than rely on a formal regulatory system.

### 3.2. FRESH FOOD VENDORS' FOOD SAFETY KAPS

Across LMICs, street food and market vendors selling fresh and ready-to-eat foods are highly motivated to sell safe foods. Vendors tend to be highly sensitive to consumer opinion, so they are keen to maintain a reputation for prioritizing food safety and selling only the highest quality foods (17). However, findings from the literature (16) indicate:

- *Knowledge*: Vendors operating in the informal food sector generally have lower levels of knowledge about food safety than consumers;
- *Attitudes*: Most vendors appear willing to receive information on food safety or to comply with food safety best practices, maintaining relatively positive attitudes; and
- *Practices*: Though vendors generally self-report high adherence to food safety best practices, observations often find vendors take inadequate food safety precautions.

These results on practices can be explained by the variety of challenges that vendors face in the enabling environment (at the individual, market, and governmental levels) that make it difficult to implement food safety best practices (16). Therefore, vendors are promising partners for interventions seeking to improve the safety of nutritious foods (17).

As with interventions seeking to change consumers' food safety behaviors, context-specific research is necessary to design interventions that are: relevant to the local community, recognize sociocultural norms, and leverage preexisting knowledge and attitudes related to food safety (14).

### 3.3. GENDER DYNAMICS

Across food supply chains, gender norms reflect and reinforce who plays what roles, with significant implications for food safety risks (1,17). For example, women are overrepresented in the agricultural and food processing sectors across many value chains in LMICs because work in this sector is perceived as appropriate for women; by contrast, women are generally underrepresented in other post-production sectors (e.g., food distribution and retail) due to limited mobility and lack of start-up finances (1,17). Likewise, traditional markets are spaces in which culturally specific social norms dictate women's

roles (1,12,17). Given the common division of labor in LMIC households whereby women are expected to acquire and prepare foods, women often comprise the majority of consumers in traditional markets (1,17). Simultaneously, women in African and Asian countries often participate in the workforce as traditional market vendors, supplementing household income and serving as key contributors to local economies (20).

EatSafe specifically examined the role of gender in its analysis of the food safety data landscape. Data disaggregated by gender is generally lacking in food safety indicators (1,2). This points to the need for improved selection and application of sex-disaggregated data in food safety indicators (7). For some hazards, gendered differences in illness rates may reflect occupational behaviors rather than biological differences (e.g., workers in slaughterhouses are usually men), though this distinction may not be immediately clear in discussions about food safety and gender (2).

#### 4. IMPROVING FOOD SAFETY IN TRADITIONAL MARKETS VIA BEHAVIOR CHANGE

EatSafe's primary objective is to engage and empower consumers, vendors, and traditional market actors to demand safe, nutritious food. Generating demand requires motivating and incentivizing people to make new and/or different choices. Interventions with the greatest potential for significant and sustained change tend to provide people with the incentive to change their behavior and leverage their emotions, as knowledge acquisition alone is not sufficient (16,20). People do not make decisions in isolation and while motivation is necessary to change behavior, it may not be enough as impediments in the food environment and lack of available resources often affect their ability to implement changes, despite their intentions.

The EatSafe program designed a framework for implementing improved food safety in traditional markets, guided by three domains (**Figure 2**):

- **Positive behavior change:** Psychosocial and emotional mechanisms, like social norms and self-efficacy are key motivators for people. Changes in consumers' and vendors' food safety behaviors can be measured via knowledge, attitudes, and practices (KAPs) models.
- **Best practices and appropriate technologies:** Well-established food safety standard operating procedures, and the technologies that support them, can and should be adapted based on local contexts; and
- **An enabling environment:** Public policy (i.e., laws, regulations), physical infrastructure (i.e., water, sanitation, and hygiene), and social networks (i.e., consumer advocacy groups, vendor associations, etc.) must all work in tandem to change social norms and stimulate behavior change.

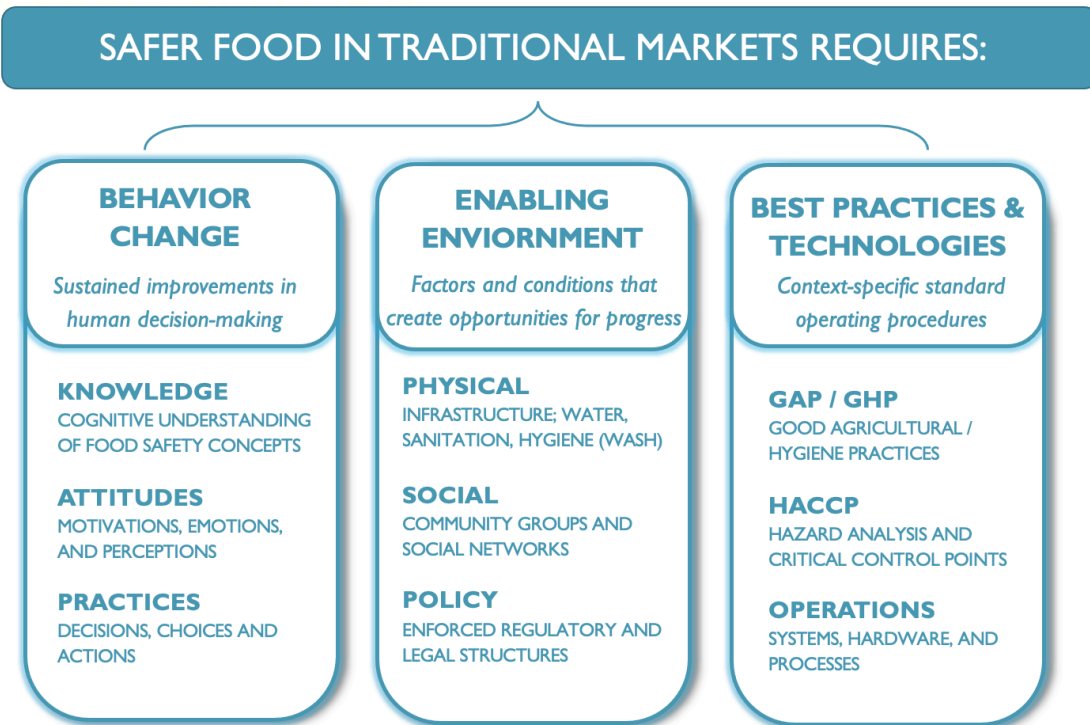
While EatSafe focuses on the behavior change impacts, all three are critical to meaningful improvements in food safety in the markets. The dimensions are described in the sections that follow.

#### 4.1. POSITIVE BEHAVIOR CHANGE

As noted above, EatSafe measures behavior change by evaluating differences in knowledge, attitudes, and practices (KAPs) among consumers and vendors before and after intervention implementation. While EatSafe interventions are not described in detail in this report, EatSafe’s formative research identified several behavior change strategies relevant here (1,21,22). Detailed further in [Appendix 3](#), EatSafe examined concepts from two fields of study that later informed the development of the EatSafe framework (**Figure 2**) and its in-market interventions:

- Social and behavior change communications: Using media platforms to strategically disseminate messages that motivate people to change their behavior;
- Behavioral economics: Target individual preferences, environmental factors, and social norms to improve decision-making.

**Figure 2.** Three dimensions of improved food safety in traditional markets



#### 4.2. ENABLING ENVIRONMENT

An enabling environment refers to the sociopolitical contexts, institutions, and structures that enable or inhibit improvements in food safety. Using a socioecological model, the enabling environment has a strong overlap at the community, interpersonal, and individual levels (23,24), as visualized in **Figure 3**.

The enabling environment can include both enabling factors (i.e., facilitators) and disabling factors (i.e., obstacles) to positive change. EatSafe grouped its insights related to the

enabling environment for food safety into three categories: policy and regulation, social norms, and physical infrastructure.

**Figure 3.** Adapted from USAID’s *Advancing Nutrition* (23,24); the socioecological model for behavior change



#### 4.2.1. POLICY AND REGULATION

Effective implementation of food safety regulations, policies, and laws is critical to an enabling environment that safeguards public health and ensures accountability across global, regional, national, and local governance structures (25).

**Global policy.** Recent international initiatives have focused on food safety in traditional markets: the WHO adopted a Global Food Safety Strategy that prioritized improving food safety in traditional markets (26); the Codex Alimentarius Committee of Food Hygiene agreed to develop guidelines to improve food safety in traditional markets (27); and

the Food Safety Strategy of Africa, developed by the African Union, will provide a harmonized framework to mitigate food safety threats (28).

An EatSafe analysis found that different world regions recommended national governments implement regulations across similar food safety categories, like food handling, vendor health and hygiene, training, and education (11). However, these global recommendations often vary in application, as some countries may have strong food control systems with clear enforcement boundaries and associated budgets, while others may have no or a limited national food safety policy (6,11).

**National, regional, and local policy.** Responsibility for oversight of local markets and the informal food sector is often undefined at the national and regional levels and thus, if present at all, often falls to local governing bodies. This creates a status quo by which regulation of local, traditional markets is inconsistent across localities and states within a country. By contrast, local and regional agencies have clear lines of responsibility for oversight of food safety in the formal food sector in LMICs. This dichotomy has resulted in divergence in resource allocation, efficiency, and coordination between governing bodies and across local food systems. While some localities have appointed market management authorities, agencies responsible for food safety across the informal food sector are generally underregulated and under-resourced (20).

## 4.2.2. SOCIAL NETWORKS

Globally, consumers as citizens—and when united, as social networks—have a significant influence on political and policy landscapes (1). Consumer advocacy organizations can directly drive changes in policy by campaigning for improvements to food safety regulatory schemes (6). But social networks can also have an important, yet indirect and informal influence on food safety by leveraging the community as a key intervention point (1,20). Community-based organizations (e.g., vendor associations, women, or youth groups) bring together individuals of a common identity and/or those in pursuit of a common goal, facilitating peer-to-peer modeling or efforts to change social norms (20,21).

## 4.2.3. PHYSICAL INFRASTRUCTURE

Inadequate infrastructure limits the ability of vendors and consumers to improve their food safety practices (16). Most traditional markets lack the critical infrastructure to promote hygiene and food safety and may increase FBD transmission. This includes a lack of electricity; cold storage of perishable foods; limited WASH infrastructure/services, including running water for handwashing, toilet facilities, sewage, and drainage systems; substandard vendor structures; inconsistent food waste management and disposal processes; and open movement of animals (e.g., street dogs, cows) in market spaces (1,12,16,17). Research has shown positive effects of upgrading and modernizing physical market infrastructure for both food safety and nutrition at the individual and community levels (1).

## 4.3. BEST PRACTICES AND APPROPRIATE TECHNOLOGIES

Another key dimension to improving food safety in traditional markets is best practices and technologies. “Best practices” are the guidelines for food safety behaviors that become “practices” under the behavior change dimension, which characterizes individual action. In the food safety sector, well-established standard operating procedures (SOPs) frequently encompass Good Agricultural Practices (GAP), Good Hygiene Practices (GHP), and Hazard Analysis and Critical Control Points (HACCP) (7,11,12). There are a variety of technologies used to promote food safety, ranging from costly cold storage, automated or digital platforms for supply chain management, sensors for food safety assessment (i.e., spectral signatures) (29) to simple technologies, like color-coded cutting boards, hairnets, or gloves.<sup>3</sup>

In support of EatSafe’s goal to influence consumer behaviors to demand safer food, EatSafe encouraged simplified food safety best practices for traditional market actors (i.e., food vendors, vendor associations, and market management). These best practices were drawn from various sources - Codex Alimentarius’ normative guidelines for street-vended

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<sup>3</sup> Given EatSafe’s scope, the program did not focus on technologies associated with food safety best practices. However, in 2022, EatSafe held an Innovation Challenge to encourage entrepreneurs, researchers, and innovators in Nigeria and Ethiopia to develop solutions for food safety problems specific to markets in their communities – many of which referenced or adapted these technologies (29).



foods, vendor training materials from the Food and Agriculture Organization (FAO) on traditional food markets, and simplified communications materials designed for consumers, like the World Health Organization’s Five Keys to Food Safety (11,12,14,27,30). As shown in **Table 3**, EatSafe organized these best practices into three categories: vendor practices, food handling, and the market environment.

**Table 3. EatSafe's simplified food safety best practices for traditional markets**

DOMAIN	DESCRIPTION
<b>VENDOR PRACTICES</b>	
Vendor Training	Trained vendors demonstrate good food safety practices, as an indication of their responsibility and commitment.
Vendor Health	Vendors stay away from work if they feel sick, as ill food handlers can contaminate food.
	Vendors do not cough or sneeze over the food or near where food is displayed/handled.
Vendor Hygiene	Vendors wash their hands thoroughly with clean water and soap before handling food and immediately after touching money or anything dirty. Nails should be clean and no uncovered wounds.
	Vendors wear clean clothes and, while at the stall, wear a clean apron or other protective garment (e.g., face masks, hair covers, head caps).
<b>FOOD HANDLING</b>	
Microbial and Physical Contaminants	Food handling and display surfaces at the stall are raised above the ground to avoid contact with soil or mud.
	At the stall, raw meat or fish are separated from vegetables and fruits.
	Vendors use clean water for direct food contact and hand washing.
	Perishable fresh/raw food is kept cool.
Chemical Contamination	Food and non-food items like detergents or chemicals are stored separately.
<b>MARKET ENVIRONMENT</b>	
Food Stall/ Environment Cleanliness	Food/vendor stalls and their surroundings are clean, free of litter and in good condition, to avoid cross-contamination from unclean surfaces.
	Surfaces in contact with food are kept clean with no visible food residues. Cleaning tools are available and used.
	Flies, pests, and domestic animals should not be on food or around the stalls. Food stalls should not be near where live animals are kept or slaughtered.
Waste Management	Waste is removed regularly and appropriately disposed of.
	There is a dedicated container where waste from the stall is collected.
Toilet Facilities	Toilets are available, have a door, and are cleaned daily with soap and water.
	A hand washing station with soap is available.

### 4.3.1. FROM PRACTICE TO ACTION: TRAINING APPROACHES IN FOOD SAFETY INTERVENTIONS

To facilitate the translation of best practices into opportunities for action, EatSafe synthesized the literature on food safety training interventions in LMICs that included training targeted at food vendors and market actors (14,21,31).<sup>4</sup> Successful food safety trainings generally incorporated educational- or learning-based theories of change (i.e., training focuses on enhancing knowledge, skills, and competencies through structured learning experiences), though very few documented if, and how, the theories impacted decisions around intervention design (14,31). Generally, food safety trainings did not incorporate SBCC media (i.e., video, audio, mass media, social media, mobile media, or entertainment education) (21), though printed materials were used in the majority of training interventions (e.g., banners, posters, calendars) to reinforce verbally delivered content (14,31).

Overall, interventions that had individual pairings of expert instructors and individuals generally reported greater changes in knowledge and/or observed behaviors than those in group training sessions (31). Furthermore, interventions that only provided participants with food safety training were consistently not as effective as those offering training tools and addressing the enabling environment either through technology provision (i.e., hazard detection methods) or infrastructure improvements (e.g., redesigning workspaces) (14,31).

## 5. DISCUSSION

In this report, EatSafe synthesized research published across 11 literature reviews. The synthesis highlights several key findings:

- Traditional markets are hubs for commerce, food security, and unfortunately, food safety risks;
- Despite the significant consequences of unsafe food, food safety is an often-overlooked component of nutrition and food systems frameworks; and
- Consumers and vendors are motivated to improve food safety but face a variety of context-specific internal and external constraints to changing their behavior.

The complex issue of unsafe food in traditional markets in LMICs requires a multi-faceted approach that tackles the problem from different angles: behavior change, enabling environment, and best practices and technologies. Occurring simultaneously is the complex interplay between food safety and nutrition and the impact of unsafe food across the food system.

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<sup>4</sup> The studies covered media-based interventions leveraging SBCC in food safety-adjacent sectors (e.g., health, nutrition, and WASH (21); a review of food safety interventions in the informal food sector (i.e., street food sellers and traditional food markets) (14); and a focused evaluation of the key characteristics of food safety training interventions in LMICs (31).



To bring about meaningful change in food safety in traditional markets, it is essential to foster positive behavior change. It is not enough to just provide knowledge; programs must also seek to change attitudes and practices to sustain improvements. This can be achieved through various strategies that leverage insights from social and behavior change communications and behavioral economics. Case in point: consumers often prioritize convenience and price over food safety, and often lack the knowledge to make informed decisions about food safety while shopping in traditional markets. Strategies that seek to raise awareness of the health consequences of safe food and encourage consumers to pause and consider the quality of a product before buying are more likely to induce and initiate more sustained changes in behavior. Furthermore, while vendors are highly motivated to sell safe food, they often lack knowledge and face significant challenges in implementing food safety best practices. Thus, vendor-facing interventions must consider the cultural context, local norms, and incentives that influence food safety practices. Interventions that improve vendors' skills in safe food handling will be more successful if they include adjustments to the enabling environment.

The evidence provided in this report shows that unsafe food does not just pose health risks but also affects the nutrition of individuals, particularly in regions where the burden of foodborne diseases is highest. This is particularly concerning in LMICs where the informal food sector plays a significant role in the local food supply. There are many ways to tackle food safety in the informal sector such as a stronger enabling environment, more robust policy and regulatory frameworks, the fostering of positive social norms around food safety, and the improvement of physical infrastructure such as sanitation and hygiene facilities of traditional markets. The three-legged stool is a good framework to ensure that all aspects are being considered.

Gender dynamics play a significant role in food safety in traditional markets. Women, who are often the primary food handlers in households, are usually responsible for purchasing food, making them a critical influencer for improvements in food safety. Women also represent a significant proportion of market vendors, where a lack of food safety knowledge can result in the sale of unsafe food. Hence, interventions must be gender-sensitive in their approach and design, which includes developing and implementing strategies that empower women as consumers and vendors.

### *5.1. LIMITATIONS*

There are various limitations to this report. First, EatSafe's global research agenda summarized secondary research published before 2020. Readers should thus use caution in extrapolating these findings in the aftermath of the COVID-19 pandemic. Global shocks from the pandemic include increases in morbidity/mortality, geopolitical conflict, inflation and food price increases, and international movement and trade constraints – all of which impact traditional market operations and the market actors within them (32,33).

Second, this report does not include the synthesis of formative research in the countries where EatSafe operates (i.e., Nigeria and Ethiopia). The importance of context-specific research was a consistent finding across the topics explored in this report: it is critical for implementing organizations and researchers to independently evaluate the context of traditional markets and local food systems (1,6). Food safety interventions must be designed with a clear understanding of stakeholders with influence, market dynamics, existing governance structures, and priorities related to nutrition and health outcomes.

Third, the scope of the EatSafe program is limited in its focus on behavior change for stakeholders in traditional markets. The program does not explicitly work on the other factors known to improve food safety in traditional markets – i.e., enabling environments and development of best practices and appropriate technologies. It also does not look to change behaviors of actors beyond the market, whether upstream (e.g., producers, transporters) or downstream (e.g., households) although spillover effects of market efforts on other value chain actors would be something to investigate in the future.

Lastly, there is limited data availability, accessibility, and consistency on traditional markets and their food systems. This impedes development efforts and hampers the efforts of humanitarian agencies, governments, and civil society organizations who rely on timely and accurate data to assess progress on improved nutrition and food systems goals (7). Therefore, EatSafe has advocated for the development and inclusion of food safety indicators related to traditional markets in global food nutrition and food systems databases, to support programming and investment decisions (6,27).

## 5.2. CONCLUSION

Tackling unsafe food in traditional markets in LMICs requires a comprehensive approach that combines improvements in food safety regulations and infrastructure, enhancement of KAPs of both consumers and vendors, consideration of gender dynamics, and fostering positive behavior change. The themes examined in this report highlight and provide a greater understanding of how to tackle food safety in traditional markets, and how this can make meaningful contributions to strengthening LMIC food systems.

Significant efforts are being made to improve the safety of nutritious food sold in traditional markets, where the majority of LMIC populations access nutritious food. This synthesis supports this work and guides future programming and investments. Importantly, interventions must be context-specific, culturally appropriate, and cater to the unique challenges faced by the markets. It is also crucial to build an enabling environment that can facilitate these changes. Future research should continue to explore and evaluate the effectiveness of such multi-faceted interventions to ensure safe and nutritious food for all. With continued efforts towards positive behavior change, promising technologies and best practices, and support for an enabling environment, strides can be made in traditional markets to achieve global sustainability and development goals.

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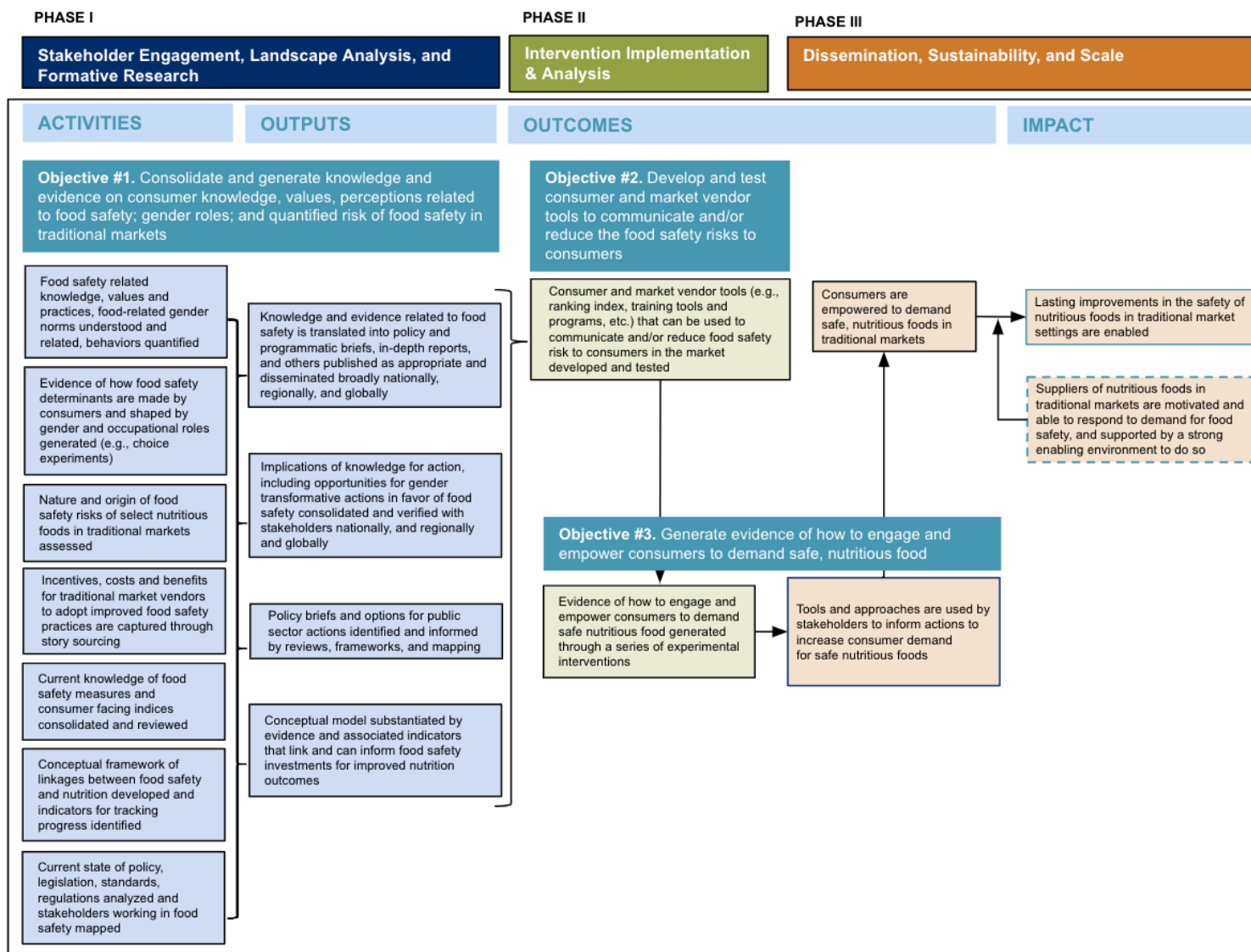
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## 7. APPENDICES

### 7.1. APPENDIX I: EATSAFE'S THEORY OF CHANGE



## 7.2. APPENDIX 2: LINKS TO REPORTS AND KNOWLEDGE PRODUCTS

### PROGRAM REPORTS

[Integrating Food Safety and Nutrition for Improved Health and Wellbeing](#)

[Assessing Food Safety Interventions Relevant to Foodborne Zoonoses in LMICs](#)

[Food Safety Education, Training and Technology Interventions in Africa and Asia](#)

[Review of Measures and Indicators for Food Safety Performance](#)

[Literature Review Linking Food Safety and Nutrition](#)

[Perspectives on Food Safety: A Review of Ethnographic Studies](#)

[Global Review of Consumer and Vendor Perspectives on Food Safety](#)

[Consumer-Facing Interventions to Improve Food Safety in LMICS](#)

[Review of Food Safety Training in Low- and Middle-Income Countries](#)

[Training with Media for Social and Behavior Change: A Review](#)

[Stories from the Forefront: Interviews with SBCC Media Professionals](#)

[Normative Guidelines for Governments to Promote Safer Traditional Markets](#)

[Report Recommending Food Safety Additions to the Food Systems Dashboard](#)

### KNOWLEDGE PRODUCTS

[Integrating nutrition and food safety in food systems policy and programming](#)

[Changing Behavior, Attitudes, and Beliefs About Food Safety: A Scoping Review](#)

[Vendor Knowledge, Attitudes, and Practices Related to Food Safety in LMICs: A Scoping Review](#)

[Regional Codex Guidelines and their potential to impact food safety in traditional food markets](#)

[Synthesis of descriptive ethnographic literature about beliefs, values, and sociocultural patterns about food safety in LMICs](#)

[Food safety interventions relevant to foodborne zoonoses in LMICs](#)

[Food safety interventions in Asia](#)

[What do traditional markets have to do with health and development?](#)

[Food safety policy can protect consumers in traditional markets](#)

[Global Focus for Food Safety Turns to Improving Traditional Markets for Food](#)

[Foodborne zoonoses control in LMICs](#)



### 7.3. APPENDIX 3: ADDITIONAL DETAILS ON BEHAVIORAL APPROACHES

Social norms are culturally constructed rules that can strongly impact individual KAP, guiding people's behaviors in groups and societies (17). Social norms are generally modifiable at the societal level over longer periods but can be difficult to change in the short term (16). A well-documented set of social norms are the strict gender rules that dictate when and how women and men should interact with one another in public and private settings (1,17). Sociocultural norms may impact the types of foods consumed; for example, certain characteristics of foods may lead to perceptions of being "hot" or "cold," season foods, which leads to differing consumption patterns (which may influence food safety). These norms should be considered when trying to change individual behaviors.

**Social and Behavior Change Communications (SBCC).** Though SBCC has long been used in international development and nutrition programs, only recently has it been introduced into interventions seeking to improve food safety (21,34). SBCC strategies can provide information to an audience while entertaining them through storytelling and delivering content via engaging narratives that stimulate emotional responses and activate social cues – two critical determinants of behavior change (21). The most promising emotions for motivating consumers to change their behaviors around food safety include disgust (i.e., the feeling of repulsion or embarrassment), trust (i.e., the feeling of safety), and fear (i.e., the feeling of loss or heightened risk) (20).

By leveraging behavioral mechanisms drawn from behavior economics (see section below), stories based on the local cultural context allow audiences to become emotionally engaged, and more open to the core messaging of the intervention (34). The content in SBCC interventions should be developed iteratively, and broadly include (20,34):

- Stories that emphasize self-efficacy so audiences feel they can change behavior;
- Character identification to allows audiences to connect to the action in the story;
- Distribution that requires engagement early and often with audiences; and
- Participation of target audiences via testing of scripts, stories, and characters to ensure cultural context is appropriate.

**Behavioral Economics.** As a field, behavioral economics provides tools to understand how and why individuals' behaviors deviate from expectations. Behavior change interventions can leverage a variety of behavioral mechanisms from the field of behavioral economics covering the preferences, beliefs, and environmental factors that encourage behavior change or reduce the barriers to it. EatSafe explored behavioral mechanisms drawn from the field of behavioral economics to determine what conscious and unconscious factors would increase the likelihood of consumer behavior change, as shown in **Table A1**.

**Table A1.** Key behavioral mechanisms for improvements in food safety

TERM	DEFINITION
<b>INDIVIDUAL</b>	
<b>Knowledge</b>	<ul style="list-style-type: none"> <li>An individual's familiarity with concepts and techniques acquired through lived experience or education</li> </ul>
<b>Salience</b>	<ul style="list-style-type: none"> <li>"Top-of-mindness" (i.e., noticeable or important).</li> <li>The importance of a particular topic in relationship to others.</li> </ul>
<b>Motivation</b>	<ul style="list-style-type: none"> <li>An individual's willingness and desire to change their behaviors, and the process by which they initiate and sustain the changed behavior</li> <li>Can be supported by incentives (i.e., rewards) aligned with the desired behavior</li> </ul>
<b>Overconfidence Bias</b>	<ul style="list-style-type: none"> <li>When an individual's subjective perception of their capability to make optimal decisions is higher than its objective accuracy (i.e., false belief that one is more capable than they are)</li> <li>Linked with higher social status/influence in social identity groups</li> </ul>
<b>Self-efficacy</b>	<ul style="list-style-type: none"> <li>An individual's subjective perception of their capability to make optimal decisions to ensure their food is safe for consumption</li> </ul>
<b>Loss Aversion</b>	<ul style="list-style-type: none"> <li>An individual's tendency to overweigh the impact of losses compared to gains when making decisions</li> <li>Moderate amounts can protect oneself from danger, while excessive amounts can limit opportunities/lead to suboptimal outcomes</li> </ul>
<b>Heuristics/ Cues</b>	<ul style="list-style-type: none"> <li>Cognitive processes that facilitate decision-making; serve as a "rule-of-thumb" or mental shortcuts</li> <li>Make complex decisions easier but do not necessarily help people make optimal decisions, because the cues used in the heuristic are based on existing knowledge and practices</li> </ul>
<b>Risk Perception</b>	<ul style="list-style-type: none"> <li>An individual's subjective evaluation of risk (e.g., perceived likelihood of foodborne illness from the consumption of unsafe foods)</li> <li>The degree to which individuals are willing to accept an adverse food-related incident</li> <li>People's verbal (or non-verbal) reported actions to reduce risk of harm</li> </ul>
<b>INTERPERSONAL</b>	
<b>Sociocultural Norms / Social Norms</b>	<ul style="list-style-type: none"> <li>The rules that guide behaviors in groups and societies</li> <li>Impacted by religious or ethnic social group identities</li> <li>Subtly/overtly affect food purchasing and handling decisions</li> </ul>
<b>Locus of Control (LOC)</b>	<ul style="list-style-type: none"> <li>The extent to which individuals believe they have power over their outcomes; can be internal or external in focus</li> <li>Belief that outcomes (e.g., rewards/punishments) are a function of factors within one's control (internal LOC) or beyond one's control (external LOC), rather than luck, fate or chance</li> </ul>

Source: (19,35)