Principles and Practices of Effective Food Safety Risk Communication – Introducing the Asia-Pacific Economic Cooperation Food Safety Risk Communication Framework

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ABSTRACT

This paper describes the principles and practices of effective food safety risk communication developed under the "Asia-Pacific Economic Cooperation Food Safety Risk Communication Framework and Associated Guidelines". The framework recommends that effective food safety risk communication needs to be centered on the clear goal of protecting consumer health by ensuring transparency and timeliness, and communication on food safety matters should be conducted in a two-way process. It emphasizes the need to provide the public with credible information based on science and evidence and highlights that food safety is a shared responsibility among all stakeholders, including industry, government agencies, media organizations and consumers. It further highlights that food safety risk communication needs to be conducted in a consistent, systematic, inclusive, consultative, and preventative manner. The framework also indicates that effective food safety risk communication needs to pay attention to the backgrounds, experiences, and needs of concerned audiences. It stresses the importance of continuous improvement of the communication system to ensure food safety risk communication to be effective. Focusing on effective communications in response to food safety incidents, emergency or crisis situations, as well as everyday food safety communications, these principles and practical guidelines will help food safety regulators, food industry, food safety educators and other stakeholders improve their communications with target audiences.

1. INTRODUCTION

Communication with the public from food safety regulatory authorities (competent authorities) plays an important role in maintaining the public's trust and confidence in the safety of the food supply and the food safety regulatory system within the economy. Communication during a food safety incident, emergency or crisis presents significant challenges to competent authorities due to the complexity of the food safety matters, the unknowns and uncertainties involved. Oversights have occurred in the past, such as, reassuring the public that British beef was safe to eat during the peak of the bovine spongiform encephalopathy crisis in the 1980s [1], incorrect attribution to tomatoes in the early stage of an investigation of an outbreak caused by *Salmonella* Saintpaul in 2008 [2], and speculation of the source of the contamination to cucumbers imported from Spain during the initial stages of the investigation of an outbreak caused by *Escherichia coli* O104:H4 in 2011 [3].

Such challenges arise primarily from difficulties associated with communicating uncertainties associated with food safety hazards including their origin, transmission routes, extent of the susceptible population exposed, and severity of potential negative health effects [4,5].

Food safety regulators also face challenges when carrying out everyday food safety risk

communication (FSRC) activities in non-emergency contexts. Examples include food safety campaigns associated with seasons and festivals, activities conducted to promote and encourage good hygiene practices by food handlers in households and food business settings, and activities conducted to raise awareness and disseminate information on current and emerging food safety risks. Modern technological innovations such as food irradiation, genetic modification of food crops or animals, nanotechnology, cell-based meat, accelerating spread of antimicrobial resistance, more frequent climatic extremes, and contamination by microplastics [6,7] are among various hot topics presenting unique challenges to everyday FSRC. These include communicating the management of food allergens, chemical or microbiological contamination, and naturally occurring toxins associated with food consumption [8]. Additional emerging food safety concerns that need to be communicated are risks associated with food fraud, such as melamine contamination in milk and powdered infant formula [9-11]. In these communication situations, tensions can emerge between food safety regulator's goal of providing consumers with accurate science and evidence-based information and the public's perception of the food safety risk.

Communication challenges can also arise from difficulties associated with understanding the

public's perception of food safety risks (risk perception) and managing the public's expectations through a communication narrative that is understood by the public. Risk perception is influenced by stakeholders' attitudes, beliefs and behavior, level of knowledge and literacy on public health risks of food safety matters, previous experiences with food safety issues, cultural backgrounds, and their socioeconomic status [12-15].

Swift transition to a digitalized world, particularly the rapid evolution and extensive use of social media by the public, contributes to FSRC challenges. Social media connects people, and information can spread quickly through its platforms to achieve tremendous outreach. This information can include those from trusted sources and also misinformation and disinformation [16]. As indicated by Lesher et al. [17], the Internet has reshaped and amplified the ability to produce and perpetuate false and misleading content.

FSRC from competent authorities to the public often is a one-way process. However, in many situations, it is necessary to listen to, digest and integrate the feedback from the public into FSRC messages to make them more effective. This two-way communication process involves the reciprocal exchange of messages between the competent authority and the public [18]. Two-way communication is a more complex process and poses significant challenges to competent authorities.

If these communication challenges are not dealt with adequately, negative public health consequences in any given food safety incident, emergency, or crisis, may be exacerbated. Furthermore, they can damage the public's trust and confidence in an economy's food safety regulatory system, and impact negatively on food trade.

Recognizing these communication challenges and aiming to support developing FSRC capacities, Food and Agriculture Organization of the United Nations (FAO) and World Health Organization of the United Nations (WHO) have published a series of guiding materials [13,19-21]. Competent authorities of the APEC region have also invested considerable efforts in recent years to help manage the challenges of FSRC. These efforts include 1) improving communication practices within the organizations, 2) enhancing FSRC with the

public through policy initiatives to strengthen stakeholder engagement, 3) developing practical and innovative tools for food safety education and information exchange to influence public's perception of food safety, and 4) developing effective approaches for consumer food safety outreach and education through the establishment of a comprehensive understanding of how consumers handle and prepare food.

The preparation of the APEC Food Safety Risk Communication Framework and Associated Guidelines (APEC framework and guidelines) discussed in this paper reflects the desire and efforts by competent authorities in the APEC region to improve the effectiveness of current and future FSRC. The APEC framework and guidelines is a result of considerable collaborative efforts by member economies and builds on and contributes to a larger body of regulatory FSRC knowledge and practices already developed by competent authorities, FAO, WHO, Codex, industry, and academics working in the field of FSRC.

2. METHODS

2.1 Participation

The principles and guidelines of effective FSRC were developed through an APEC project initiated and managed by Food Standards Australia New Zealand (FSANZ) in collaboration with Food Industry Asia and cosponsored by Chile, China, New Zealand, Singapore, Philippines, and the United States. This project was conducted from February 2020 to February 2022 and involved nominated participants of competent authorities, peak food industry organizations, and academic institutions from 18 APEC member economies. Additional participants included representatives of the FAO and the WHO's Western Pacific Regional Office.

The project work included a review of literature and a scan of FSRC policies and recommended practices published by competent authorities in the APEC region and beyond. In conjunction with the formulation of the framework and guidelines, four virtual workshops with over 100 participants per workshop, and seven rounds of electronic consultations were conducted. From this effort, the APEC framework and six practical guidelines of effective FSRC were prepared, agreed to, and offered as a new practical tool titled ***APEC Food Safety Risk Communication Framework and Associated Guidelines*** [22].

2.2 Development of Principles

Workshop 1 conducted in July 2020 explored challenges faced by competent authorities and food industry in FSRC, and led to the establishment of the purpose and scope of the framework. This workshop explored principles of effective FSRC through exchange of communication practices by competent authorities, industry, and FAO and WHO. Six principles were proposed in September 2020 based on a review of a wide range of literatures [13,21,23-27], and relevant publications by competent authorities and industry. Subsequently, the principles were expanded to eight at the end of 2020, through consultations with members of the e-working group established after Workshop 1 by including "Two-way communication" and "FSRC is iterative and requires continuous improvement". These principles were finalized following further consultations and discussions at Workshop 2 held in December 2020.

The eight principles of effective FSRC were expanded and adopted to cater for FSRC needs of food industry (see Industry Annex of the APEC framework and guidelines).

2.3 Compilation of the Best Practices in Effective FSRC in the APEC Region

In distilling the best practices of effective FSRC, a search of relevant publications and approaches taken by competent authorities in the APEC region was conducted after Workshop 1. This search generated a list of FSRC efforts across APEC member economies that was enriched subsequently with information provided by project participants. The distilled list (Fig. 1) represents some of the best practices in FSRC by competent authorities and the food industry in the APEC region.

2.4 Development of Guidelines

Workshop 2 conducted in December 2020 developed synopses of the key content and structure of six practical guidelines. Guided by the synopses, the project's drafting team prepared the first draft of the guidelines in January and February 2021. Each draft guideline

was peer-reviewed by three team members independently in the final week of the draft preparation process. Six draft practical guidelines were distributed to members of the e-working group for consultation in March 2021.

With recommendations received from the electronic consultations, the guidelines were further consolidated, merged and edited, and incorporated into the APEC framework and guidelines.

2.5 Editing and Digital Design to Finalize the APEC Framework and Guidelines

Following Workshop 3 held in May 2021 and further revisions made, the APEC framework and guidelines were edited by an independent scientific editorial service. The edited APEC framework and guidelines were subsequently transferred into a digital document to improve user experience. The APEC framework and guidelines were endorsed as an APEC publication by member economies and published on the APEC website in February 2022.

3. RESULTS

3.1 Principles of Effective FSRC

The identification of the challenges faced by competent authorities in communicating food safety matters to the public established the cause and motivation for the development of a set of guiding principles to assist competent authorities and food industry to improve the effectiveness of their FSRC. As described in the methods section, these principles were developed as a result of a review of a wide range of literatures and relevant publications and approaches taken by competent authorities in the APEC region and reflected the FSRC efforts across APEC member economies (Fig. 1). Full description of the principles are provided in the framework document [22].

Principle 1 - protection of consumer health - recognizes that competent authorities' FSRC systems should be developed and implemented with the primary goals of protecting consumers' health and fostering public trust and confidence in the safety of the food supply.

2020

❖ **U.S. Department of Agriculture's Food Safety and Inspection Service** hosted an online event in 2020 to establish a comprehensive understanding of how consumers handle and prepare food to assist the development of an effective approach for consumer food safety outreach and education

❖ **Food Industry Asia (FIA)** released Food Risk Communication Field Guide I: Traditional Food Risk Communication and Food Risk Communication Field Guide II: Modern Food Risk Communication in 2020 to improve industry's FSRC with the public

2019

❖ **Chile's National Food Safety and Quality Agency (ACHIPIA)** developed a range of 'Creative Tools' in 2019 to improve food safety education and communication with a focus on the management of public perception of food safety and food safety outreach through social media

❖ **Singapore Food Agency (SFA)** launched the "Risk-at-a-Glance" and "What's on the Table" initiatives in 2019 aimed to provide consumers bite-sized information on food safety risks

2017

❖ **U.S. Food and Drug Administration (FDA)** developed a Strategic Plan for Risk Communication and Health Literacy (2017 – 2019) to improve FDA staff risk communication skills in 2017

2016

❖ **Food Regulatory Standing Committee of the Australian and New Zealand Ministerial Forum** published "Engaging in the Australian and New Zealand Joint Food Regulation System" in 2016 to guide FSRC by competent authorities in Australia and New Zealand

2015

❖ **International Food Information Council** released Food Safety: A Communicator's Guide to Improving Understanding in 2015 to improve industry's food safety communication with public

2014

❖ **China's National Health Commission** issued a Technical Guideline on FSRC in 2014 to the provincial health authorities, China Centre for Disease Control and Prevention, National Health Monitoring Centre, and China National Centre for Food Safety Risk Assessment

2009

❖ **U.S. FDA** published a Strategic Plan for Risk Communication which described the underlying principles and strategic goals of FSRC in 2009

❖ **The Ministry of Food and Drug Safety (MFDS) of the Republic of Korea** established a Food-Medicine Safety Open Forum and operated a consumer-orientated public communication system in 2009. Through the system, MFDS regularly communicated through its public-private communication channel, such as the public communication group with stakeholder groups

2006

❖ **Health Canada** published the Strategic Risk Communications Framework in 2006 to support staff with risk communication responsibilities to take a strategic and systematic approach to formulating and implementing effective risk communication

2001

❖ **Thai Food and Drug Administration** established and implemented the "Young FDA Inspector" project in 2001 to provide food safety education to school students

Fig. 1. Examples of FSRC efforts by competent authorities and food industry of the APEC region between 2001 and 2020

Principle 2 - transparency and timeliness - emphasizes that competent authorities' FSRC systems should be transparent and open to scrutiny by stakeholders. This can be achieved through clear purpose, scope and intended outcomes of the communication, both verbal and written, as well as timely exchange of information between competent authorities and all concerned

stakeholders. Transparent communications acknowledge current issues, existing knowledge and knowledge gaps on the subject matter, including associated uncertainties. Transparency requires informing stakeholders what is currently known, what is unknown, why it is unknown or uncertain, what is being done to resolve uncertainties, and what is recommended based on the best available information. Transparent communication also requires acknowledging that the authority's advice may change as better and more complete information becomes available.

Timeliness of the communication messages is important in FSRC because of:

- the urgency and potential consequences on consumer health and safety imposed by the foodborne incident or emergency
- risk management decision-making being impacted by limited availability of information
- time taken to assess the food safety risk
- coordination and consultation among various competent authorities involved and concerned stakeholders.

Principle 3 - two-way communication – recognizes that FRSC is an interactive process of exchanging information and opinions between competent authorities, the public and the food industry on food safety matters. Two-way communication reflects the interactive nature of FSRC, and requires understanding of the needs of relevant stakeholder groups. It allows parties involved to convey FSRC messages, receive feedback and come to shared understandings regarding the food safety risk. This is built upon effective stakeholder engagement and consultation. Facilitation of this interactive communication can be achieved through various channels including the competent authority's social media platforms, live chat, blogs and consumer hotlines. Traditional one-way communication channels such as radio, TV, videos, newspapers, magazines and the competent authority's website can be used to increase the awareness of the two-way communication process. Two-way communication means also keeping in contact with the public, making it evident that concerns from stakeholders have been heard and demonstrating empathy. In doing so, two-way communication contributes to building and maintaining the public's trust in the economy's food safety regulatory system.

Principle 4 - credible information based on science and evidence – regards that competent authorities' FSRC systems should disseminate only credible information based on science and evidence. In conveying credible information to the public, competent authorities should consider the nature of the hazard, the associated culture and socioeconomic status of the stakeholders involved, and any other relevant factors. The spokespersons should have recognized competency, be trustworthy, fair, transparent, lack bias, be factual and knowledgeable on the subject matter. Spokespersons should act in the interest of the public, be responsible, emotionally intelligent, and culturally competent, truthful and preferably have a good "track record" in FSRC.

It is important that credible information, factual statements and risk communication messages be repeated multiple times by multiple channels. This will lead to enhanced outreach and improvement of the public's trust in the economy's food safety regulatory system.

Principle 5 - food safety is a shared responsibility: specific role of various stakeholders in FSRC – states that competent authorities' FSRC systems should promote awareness and understanding of specific food safety issues under consideration by all stakeholders. The systems should recognize that food safety is a shared responsibility of all stakeholders, including regulators, food business operators, consumers, food safety researchers and the mass media.

Competent authorities should lead FSRC, associated food safety education and information exchange, and consumer and public engagement. In this regard, competent authorities are responsible for providing consumers with clear and timely information to protect them from foodborne illness. The economy's leading food safety authority should collaborate with other relevant government authorities to develop a single source of authoritative information on foodborne risks as well as on good food hygiene practices during a food safety incident or emergency or crisis.

Food business operators have a primary role and responsibility for ensuring the safety of their food products so that they will not cause harm to consumer health if the food products are prepared and consumed according to their intended use. Food business operators have the responsibility of providing clear and

understandable food preparation instructions for consumers, educating the supply chain operators on how to properly handle food products, sharing product information with food safety regulators to help develop a risk profile when needed and instructing consumers on how to properly dispose of a contaminated product. Food business operators play an active role in FSRC by providing consultation, responding to concerns and engaging in two-way communication with their stakeholders.

Consumers have the right to express their opinions, concerns, appeals and understandings so that other stakeholders can measure the effectiveness of, and make improvements to FSRC messages. Consumers should be encouraged to share accurate food safety information with others and to be able to recognize and not pass on false information concerning food safety to others. Consumers also have a responsibility of following food safety recommendations provided by competent authorities and managing food safety risks under their control.

Academics and scientific institutions are a valuable source of expertise and support the scientific foundation of FSRC. Scientific publications that evaluate stakeholder concerns and needs during a food safety incident or emergency or crisis will support the improvement of the effectiveness of FSRC.

Mass media, including those who write food safety news and those who use social media to convey food safety messages, not only have a role but also a responsibility to provide accurate and truthful information to the public. Mass media, including social media platform providers, have a responsibility to prevent the circulation of misinformation and disinformation from being transmitted to the public.

Principle 6 - audience-orientated and inclusive – recommends that competent authorities' FSRC systems should ensure appropriate involvement of all interested parties in the FSRC process. The interested parties should encompass those who are most vulnerable to, those who may be responsible for, and those who have a responsibility to propose solutions and solve the food safety issue. The dialogues with the interested parties around the science and evidence, about reasonable/practical/actionable risk management strategies, and relevant barriers to act, should consider the culture, value,

socioeconomic status and other relevant factors of the parties involved.

It is recognized that the perception of the level of food safety risk by the public may not always align with the findings of a risk assessment based on the scientific evidence. Risk perception involves factors such as ethical or cultural background, technical understanding, level of control of the risk, prior experience and whether there is a benefit perceived. FSRC messages should recognize and acknowledge these risk perceptions while providing information based on science and evidence, to help reduce the gap between the real and perceived risk.

Principle 7 - consultative, consistent, systematic and preventative – states that competent authorities' FSRC systems should aim for information exchange in a consultative, consistent, systematic, and preventative (CCSP) manner, based on risk assessment findings. This approach should take into consideration knowledge, attitudes, values, practices, and perceptions of interested parties. Stakeholder engagement needs to be consultative. It means that the views from concerned stakeholders are listened to and taken into consideration in developing FSRC messages. The messages communicated need to be consistent to facilitate effective FSRC. The overall communication process needs to be systematic, that is, a coordinated approach following a defined policy rather than an improvised and reactive response. FSRC messages need to be preventative and proactive.

The CCSP manner should be implemented in both everyday FSRC and in incident, emergency, crisis FSRC.

Principle 8 - FSRC is iterative and requires continuous improvement – recognizes that FSRC is a progressive and iterative process based on the latest science and evidence. Communication messages should be updated in a timely manner as new evidence and science become available taking into consideration the evolving information being communicated by other stakeholders.

Competent authorities should have the ability to undertake continual improvement and regularly assess the effectiveness of their FSRC systems. This includes assessing the reach, trust in and effectiveness of their FSRC systems with respect to relevant segments of the public to inform on aspects for improvement.

The continuous improvement of the FSRC system should consider the following components:

- development of FSRC skills to meet communication needs during a food safety incident or emergency or crisis
- improvement of the effectiveness of two-way communication in food safety education, information exchange between competent authorities and the public and food industry
- proactive use of social networks to facilitate information dissemination and to collect information about public concerns and opinions
- adoption of the latest communication technologies and tools to assist FSRC.

The above eight principles of effective FSRC are designed to enrich and be complementary to the existing principles of FSRC developed by individual competent authorities and food businesses.

3.2 Practical Guidelines to Effective FSRC

To facilitate the uptake and implementation of the principles of effective FSRC, two foundational guidelines, three supplemental, and one industry guideline were developed under the APEC framework and guidelines (Fig. 2).

3.2.1 The rationale for developing the guidelines

In the process of developing the APEC framework, two conclusions reached were on the need to: 1) describe how the principles of effective FSRC can be used in practice, and 2) develop concise and practical "how-to" guides for emergency and everyday FSRC to improve the likelihood that risk communicators would use and apply the principles of effective FSRC in their communication efforts. These conclusions resulted in the development of foundational guidelines to aid in the implementation of the principles and in the monitoring and review of the organization's FSRC system. Supplemental guidelines which address how to apply the principles of effective FSRC for communications during food safety incidents, emergencies and crises, and for everyday communication situations, were developed. Given the strong interests received at Workshop 2 on social media engagement in FSRC, a separate supplemental guideline of using social media engagement in FSRC was also prepared. These guidelines provided hands-on communication tools to facilitate the uptake and adoption of the principles of effective FSRC by competent authorities. In practice, these guidelines will complement or serve as a template for those internal guidelines.
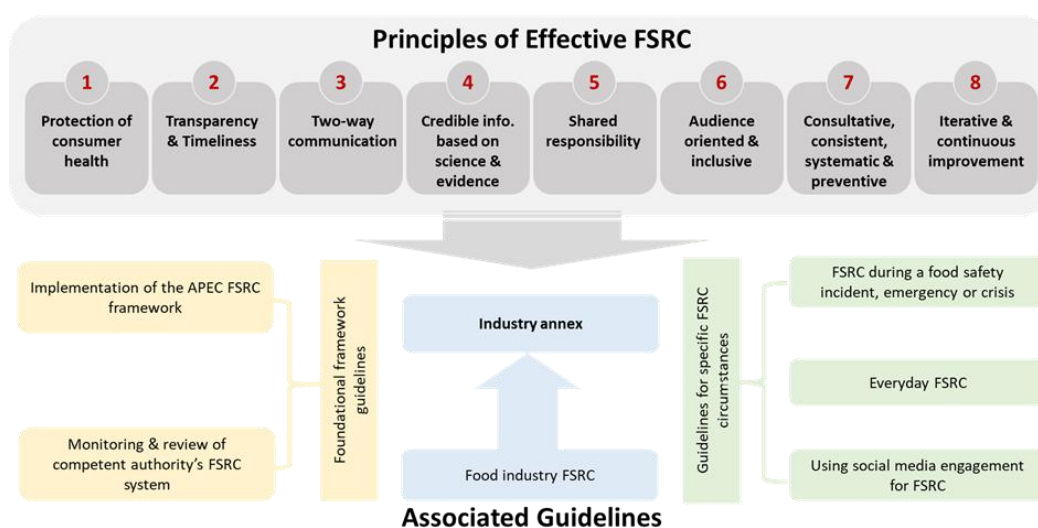

Fig. 2. APEC framework and guidelines

The flow on benefit realized through the close collaboration between competent authorities and the food industry in the development of the APEC framework, prompted the preparation of industry guidelines on FSRC as a component of the APEC framework and guidelines.

3.2.2 The uniqueness of the guidelines

The guidelines associated with the APEC framework are unique from the existing FSRC publications in that they:

- provide practical guidance and multiple ready-to-use templates to users
- present easily adaptable guidelines because of their concise nature
- place a greater emphasis on the collaboration between the competent authorities and the food industry as illustrated by a dedicated food industry guideline
- include instructions on self-implementing the principles of effective FSRC and self-monitor and reviewing the existing FSRC system
- can be easily modified and adapted by individual competent authority or a food business to supplement the organization's existing FSRC guides and can be used independently or together, depending on specific needs
- give users the maximum flexibility as guidelines to assist FRSC for particular food safety situations or to improve organization's overall FSRC system.

The guidelines, like the principles of effective FSRC, are unique because they benefited from an unusually high level of participation by stakeholders. More than 100 regulators, academics, communication professionals, and food industry members participated in the workshops and closely engaged in consultations during which the guideline topics and outlines were developed. More than 50 individuals from these same groups of 18 APEC member economies, FAO and WHO were directly involved in writing, commenting, editing and reviewing the guidelines. The change of the work environment under the cloud of COVID-19 pandemic toward working virtually allowed many more professionals to contribute directly to the preparation of the guidelines than would have otherwise been unfeasible in physical workshops.

3.2.3 The guidelines

The ***Guideline for Implementation of the APEC FSRC Framework*** explains how to self-assess an existing FSRC system and address the identified gaps through the implementation of the recommendations generated from the self-assessment. The process uses a baseline communication audit [28] to determine the pre-implementation adequacy of the existing FSRC system. Table 1 presents a baseline self-assessment template developed to support the implementation of Principle 1 of the APEC framework. It shows how communication audit questions can be built into a baseline self-assessment and generate meaningful recommendations.

Table 1. Example of a baseline self-assessment audit of organization's FSRC system

Framework principle	Summary of communication audit findings	Adequacy assessment	Recommendations
Principle 1: The primary goal of competent authority's FSRC system is to protect consumer health	Over the past 36 months, our FSRC has placed the protection of consumer health as the primary objective. However, in two foodborne outbreak situations, this primary objective was overshadowed by extensive efforts in tracing the outbreak and conducting risk assessments	Our organization has done well regarding the best practice of "protecting consumer health as the primary goal in FSRC". However, this becomes challenging when the facts are unclear	Knowing uncertainties are unavoidable in foodborne disease outbreak investigations, we can further improve our future FSRC by being more aware of and emphasizing the primary objective of consumer health protection with precautionary approaches in making premature announcements and by mobilizing investments to strengthen traceability and analytic diagnostic capacity

The ***Guideline on Monitoring and Review of Competent Authority's FSRC System*** addresses Principle 8 of effective FSRC, which emphasizes that FSRC is progressive and iterative. It informs users why, how, and the frequency of monitoring and reviewing an organization's FSRC system and suggests approaches to make improvements. Monitoring and review play a pivotal role in the continuing success and sustainability of the organization's FSRC system because it maintains and improves the system's effectiveness over time, although the task may be considered "not urgent but important" [29]. Table 2 is an example of a template with sample questions provided in this guideline.

The ***Guideline on FSRC during a Food Safety Incident, Emergency or Crisis*** explains how to effectively communicate with the public when public health is at immediate risk. Ineffective FSRC in these situations can impact negatively on the protection of health and safety of consumers, public's trust in the food regulation system and food supply chain, and the organization's reputation. This guideline helps users effectively and efficiently communicate food safety information to the public during the lifecycle of a food safety incident, emergency or crisis (generically referred to as events, see Textbox 1). The APEC framework and guidelines illustrate how the FSRC strategies can be used during each lifecycle phase. Easy-reference checklists have been provided to assist users in a food safety emergency situation when there is no time to read the full guideline. For example, things to do before a food safety event, questions to ask in the early stages of a food safety event, and tips for communicating uncertainty.

Table 2. Sample questions for monitoring and review of a competent authority's FSRC systems

Objectives of the FSRC system	Sample questions to be asked in undertaking monitoring and review	Sample solutions and follow up questions
Protecting consumer health	Has the FSRC consistently centered on and delivered the protection of consumer health over the past 3 years? Has the FSRC system fostered public trust and confidence in the safety of the food supply on all occasions over the past 3 years?	If yes, can improvements be made in future communications, and what are they? Can a list of improvements be compiled, and a realistic timeframe be set to reach the established milestones? How and when will these be monitored and reported? How will these contribute to fostering public trust and confidence in your organization and a safe food supply in your economy?

Textbox 1: FSRC strategies during the lifecycle of a food safety incident, emergency or crisis:

- Pre-event
  Prepare
  Engage in relationship-building with the public, particularly the key stakeholders
  Practice everyday FSRC

- During event
  Use a centralized response
  Collaborate with other authorities
  Practice two-way communication

- Post-event
  Self-assess the response
  Make improvements to benefit future responses
  Engage in relationship-building with the public
  Practice everyday FSRC

The ***Guideline on Everyday FSRC*** recommends a systematic approach to communicate with the public [13,21] when there are no food safety incidents, emergencies, or crises. The guideline explains how to proactively communicate with the public about important but non-urgent food safety matters and how to avoid or mitigate the risk (Textbox 2). It supports the regular practice of FSRC and expands relevant food safety knowledge, promoting continuous assessment and improving organization's FSRC systems. Everyday FSRC topics include, but are not limited to, new technologies, appropriate food preparation and hygiene, food fraud, microbiological and chemical hazards, and others.

Everyday FSRC is essential because it works to protect public health and build public trust by sharing information and promoting actions to prevent or minimize a potential risk from developing into a food safety emergency or crisis.

The ***Guideline on Using Social Media Engagement for FSRC*** is particularly useful due to a lack of extensive studies on how to best utilize social media for FSRC [30]. This guideline reflects social media's growing influence as a communication channel, and helps users expand the use of it to deliver effective FSRC messages to more people efficiently.

This guideline initially addressed only the question of how to use social media platforms to communicate food safety information. However, after extensive feedback from contributors, it was determined that it needed to address a more complete set of considerations while remaining user-friendly for a wide range of skill sets like baseline knowledge of social media. The guideline explains why and how to select social media platforms on which to engage with stakeholders, maintain a social media presence, develop an organizational social media policy, respond to misinformation and disinformation, and use social media for audience research and surveillance, environmental monitoring, program evaluation, storytelling and building trust.

Despite the popularity and benefits of social media as a channel to communicate food safety information, communicators are wary of social media's downsides, particularly, its ability to generate and perpetuate misinformation [16] and disinformation [31]. Neither misinformation nor disinformation is a new phenomenon, but social media amplifies the ability to spread untrue information faster and further. For this reason, this guideline dedicated a separate section to this important topic. In addition, social media platforms are dependent on technology controlled by third parties, so they can also be unreliable [32]. Social media should be just one channel in a larger, more diverse communication plan to minimize these downsides.

Finally, the ***Guideline on Food Industry FSRC*** helps food industry communicators adopt the principles of effective FSRC and the guidelines for their FSRC with the public and competent authorities. The food industry can use this guideline to improve FSRC with stakeholders and establish a common understanding that would facilitate a collaborative relationship with competent authorities when engaging in FSRC. This guideline recognizes that competent authorities and business operators play different roles and have different challenges in communicating food safety information to the public, yet they can benefit from collaborations in FSRC to identify their FSRC needs and assign relevant resources. A special section in this guideline explains how the industry can also apply strategic FSRC approaches in a food safety incident, emergency or crisis. The industry guideline is important because it actively encourages the food industry to engage in FSRC and provides the necessary tools to help them do so. Practically, food labelling has a FSRC function in everyday life and provides consumers with information such as food composition which draws consumer attention to potential allergens, directions for use, "use by" or "best before" date, storage conditions and others.

Together, the six guidelines under the APEC framework and guidelines help regulators and food business operators apply the principles of effective FSRC to improve their FSRC efforts. These guidelines acknowledge that their level of adoption and implementation will vary depending on the users' needs.
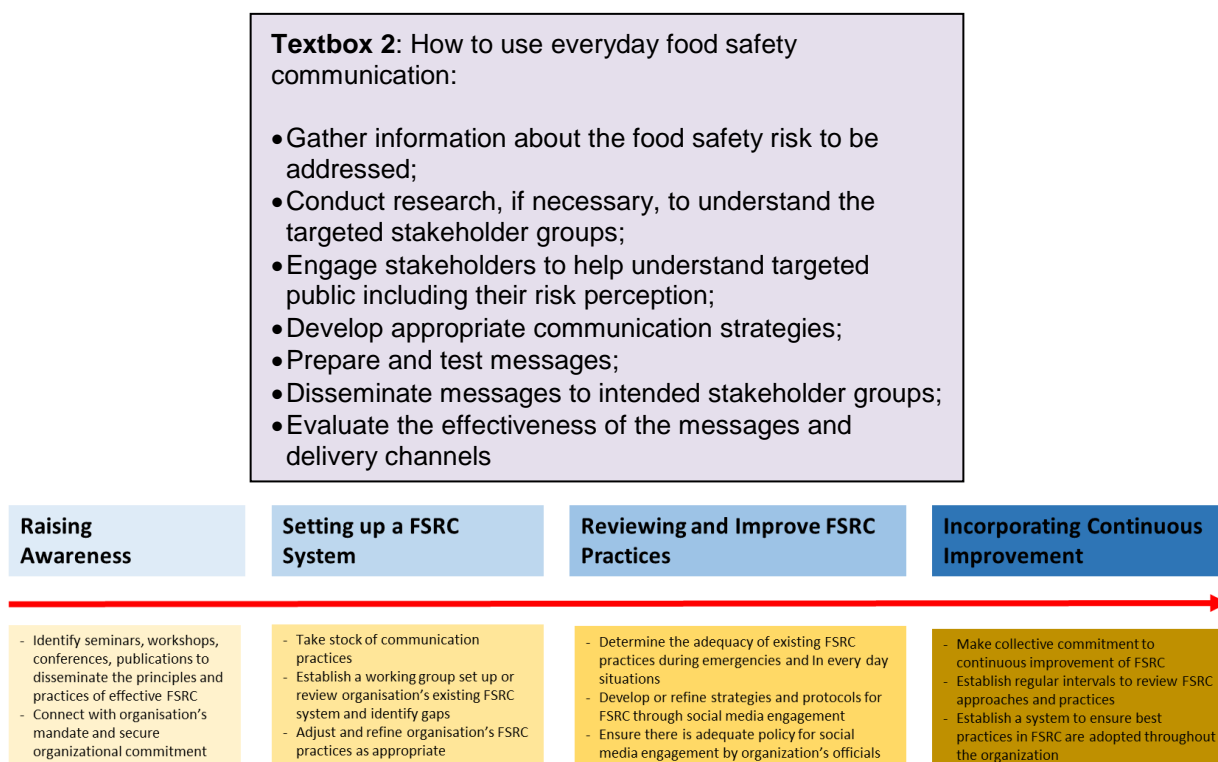
Textbox 2: How to use everyday food safety communication:

- Gather information about the food safety risk to be addressed;
- Conduct research, if necessary, to understand the targeted stakeholder groups;
- Engage stakeholders to help understand targeted public including their risk perception;
- Develop appropriate communication strategies;
- Prepare and test messages;
- Disseminate messages to intended stakeholder groups;
- Evaluate the effectiveness of the messages and delivery channels

Raising Awareness	Setting up a FSRC System	Reviewing and Improve FSRC Practices	Incorporating Continuous Improvement
- Identify seminars, workshops, conferences, publications to disseminate the principles and practices of effective FSRC - Connect with organisation's mandate and secure organizational commitment	- Take stock of communication practices - Establish a working group set up or review organisation's existing FSRC system and identify gaps - Adjust and refine organisation's FSRC practices as appropriate	- Determine the adequacy of existing FSRC practices during emergencies and In every day situations - Develop or refine strategies and protocols for FSRC through social media engagement - Ensure there is adequate policy for social media engagement by organization's officials	- Make collective commitment to continuous improvement of FSRC - Establish regular intervals to review FSRC approaches and practices - Establish a system to ensure best practices in FSRC are adopted throughout the organization

Fig. 3. A systematic process to raise awareness of and implement the APEC framework and guidelines

3.3 Applicability of the Principles and Guidelines of Effective FSRC to Users

Available data indicate that competent authorities, industry, consumers, advocacy groups, media and academics have a role in FSRC. The APEC framework and guidelines are applicable to all these sectors. Competent authorities and food industry organizations are considered the primary users of the APEC framework and guidelines. Fig. 3 presents a logical flow of a process to raise the awareness of the APEC framework and guidelines leading to its implementation. The extent of awareness raising and implementation will be impacted by the country's stage of economic development and resources available to the organization. Competent authorities can take selective and progressive steps in accordance with their own circumstances to improve the effectiveness of their FSRC with the public.

3.3.1 Applicability to competent authorities

Risk communication specialists (RCSs) within competent authorities carry the responsibility to develop and deliver effective FSRC messages to the public. They are the voice and key personnel on behalf of their organizations to inform, guide,

educate and train relevant staff including the leadership team on the best practices of FSRC. They are the driving force within the organization to proactively assess the maturity of the organization's communication capacity and capability and lead ongoing review and monitoring of their organization's FSRC strategies to pursue continual improvement of the organization's FSRC with the public. RCSs should take the primary responsibility in implementing the principles and guidelines of effective FSRC.

The organization's leadership team should support its communication specialists in implementing the framework by empowering them to develop and lead the implementation of organization's FSRC strategy. This can be expanded to lift FSRC skills of risk assessors and risk managers within the organization, and integrate the science of FSRC into their daily activities. This latter point is consistent with the trend of growing influence of communication to human life and unprecedented speed of digitalization in communication [33].

The net outcome of the above approach will be an overall improvement in the performance of the communication personnel when they speak or

write to the public and the effectiveness of the organization's FSRC.

3.3.2 Applicability to food industry

The APEC framework and guidelines recognize the critical role played by industry in FSRC as evidenced by the accompanying Industry Annex and Industry FSRC Guideline. Food business operators, regardless of the size, can benefit from the APEC framework and guidelines, particularly the Industry Annex and Industry FSRC guideline.

The APEC framework and guidelines recommend that all food business operators and organizations should have a FSRC plan in place to identify FSRC needs and assign relevant FSRC responsibilities in the organization. Depending on the size and scale of the food business, some organizations will have designated personnel responsible for FSRC although small food businesses may assign a dual function to a team or relevant staff. It is a good business practice to establish a FSRC function within the business and invest resources to build FSRC capacity. This will enable better preparedness for the business to manage a food safety incident or emergency and help mitigate damages from a food safety incident leading to better protection of food business's finance and reputation [34,35].

Food industry and the government sector play complementary roles in ensuring food safety. The industry offers first-hand knowledge and insights about its food products, possible hazards, the supply chain and data essential to identify and manage a food safety risk. The industry directly communicates with consumers on food information from a commercial perspective while competent authorities coordinate investigations and mitigation strategies during food safety incidents and provide credible information to the public. Therefore, collaboration between industry and competent authorities during both every day and emergency situations will facilitate effective FSRC with the public. Sharing information (data and evidence) between industry and competent authorities on food safety issues will assist in filling any information gaps. A close and purpose-driven collaboration between competent authorities and industry helps ensure that the best available evidence on the food safety issues is collated, and the consistency of FSRC messaging to minimize the risk of

misinterpretation of FSRC messages by stakeholders is maintained. Such close collaborations already exist in some economies and have been demonstrated to be beneficial to the development of FSRC messages to the public [36]. Food businesses can contribute information about the supply chain, assist food producers to mitigate risks at the production stage, and help consumers manage food safety risks. The enhanced collaboration between industry and regulators helps facilitate the effectiveness of food withdrawal or recall and improve traceability during food safety incidents and emergency situations. A model example of a productive engagement between competent authorities and industry is the program managed by FSANZ in its Binational Food Industry Dialogue (previously known as Retailers and Manufacturers Liaison Committee) which provides an information sharing platform between the competent authority and the food industry [37].

3.3.3 Increased responsibility of consumers as partners in FSRC

Although the APEC framework and guidelines have largely focused on competent authorities and industry stakeholders, consumers have a critical role in FSRC. As articulated in Principle 5 of the framework, FSRC is everyone's business. The growing influence of social media in FSRC underscores the increased importance of consumer responsibility in FSRC [30,38].

Throughout the development of the APEC framework and guidelines, a recurring theme was that social media is both an effective tool for FSRC [39] and for spreading false information [40,41]. This theme is encapsulated in the guideline on using social media engagement for FSRC introduced earlier. While it is generally agreed that social media provides more benefit than harm in FSRC, and the direction of FSRC outcome is fundamentally driven by users. The support provided by competent authorities and the food industry will empower consumers with knowledge and right information.

The principles presented in the framework are essential to consumers particularly when engaging in FSRC on social media. Consumers have the collective responsibility to disseminate only accurate food safety information to others (Principle 4) to ensure protection of public health and safety (Principle 1). The use of social media further presents an opportunity for consumers to

engage in rapid two-way communications with competent authorities and the food industry (Principle 3).

4. DISCUSSION AND CONCLUSIONS

The eight interconnected principles and guidelines of effective FSRC detailed in the APEC framework and guidelines provide a structured, systematic, and outcome-oriented process with guiding considerations. The APEC framework and guidelines were developed through a multi-stage, multi-stakeholder consultative and iterative process, yielding underlying principles that have been agreed to by consensus and reflect the values common to APEC government, industry and consumers. This is a tested process that can be replicated at different scales, at both national and regional levels.

The APEC framework is centered on the clear goal of protecting consumer health by ensuring transparency and timeliness and by ensuring that FSRC is conducted as a two-way process. It emphasizes the communication of credible information based on science and evidence is critical for maintaining the public's trust and confidence in the safety of the food supply and the food safety regulatory systems within the economy. It also stresses that food safety is a shared responsibility among stakeholders, including industry, government agencies, media organizations and consumers.

It emphasizes that FSRC approaches need to be consistent, systematic, inclusive, consultative, and preventative. Effective FSRC pays attention to the backgrounds, experiences, and needs of concerned audiences. It also recognizes that FSRC is iterative, encouraging regulators and the industry to be both proactive in FSRC, even under conditions of uncertainties, and to provide appropriate updates as new information becomes available.

The framework also recognizes the importance of continuous improvement processes, beginning with regularly evaluating the reach and effectiveness of communication efforts, and their intended and unintended consequences, and adopting new strategies designed to remediate deficiencies and to take advantage of new opportunities. For example, leveraging the use of social media platforms for FSRC is a significant feature of this framework and associated guidelines.

Finally, as implemented, the framework is designed to be forward-looking; thereby creating FSRC systems that can anticipate, recognize, and appropriately respond to emerging food safety risks. Food safety is vulnerable and requires continuous vigilance. Changes in the climate, environment, food processing, preservation and packaging methods, e-commerce, increasing urbanization, and the increasing complexity of the food supply chain at global, regional, intra-regional and national levels may affect food safety. New developments and changing dynamics may need to be considered by food safety regulators. The fragility of food safety increases as the food supply is becoming more complex and it dramatically increases in food insecurity contexts. Practically any driver of food insecurity, including population rise, conflict, climate variability and extremes, economic slowdowns and downturns, diseases, poverty, and others [42] has potential negative implications for food safety.

To effectively respond to both current and future challenges, commitments to improve FSRC are critical, both at the level of individual economies and through creating inter-sectoral mechanisms for communication and coordination in emergencies and in non-emergencies [19]. Concerted efforts are needed to anticipate emerging food safety risks, to engage in proactive risk communication, to strengthen and apply integrated surveillance measures in line with the One Health approach, and to strengthen early warning systems.

Because of additional costs that may be involved in playing their essential roles in FSRC, food businesses may need incentives to improve their current operational practices and to implement new procedures for communication and information exchanges. In addition, the associated benefits of doing so may need better documentation and awareness. Governments and industry associations may need to prioritize and focus on formulating policies targeted at providing firms with incentives to establish efficient actions in adopting and improving food safety communication standards, such as labelling, traceability, and recall procedures and practices.

HIGHLIGHTS

- The APEC FSRC framework was developed through a multi-stage, multi-stakeholder consultative and iterative

process - a tested pattern that can be replicated at both national and regional levels

- The APEC FSRC framework is based on eight interconnected principles
- The underlying principles have been agreed to by consensus and reflect the common value of APEC economies
- The content to be communicated through the APEC FSRC framework shall consider the specifics of food systems in different economies and anticipation of future challenges and emerging food safety risks

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