



# WHO GLOBAL STRATEGY FOR FOOD SAFETY

2022–2030

*Towards stronger  
food safety systems  
and global  
cooperation*







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GLOBAL  
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FOR FOOD  
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**World Health  
Organization**

WHO global strategy for food safety 2022–2030: towards stronger food safety systems and global cooperation

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# ACRONYMS AND ABBREVIATIONS

<b>AU</b>	African Union
<b>AMR</b>	Antimicrobial resistance
<b>ASEAN</b>	Association of Southeast Asian Nations
<b>CoP</b>	Code of Practice
<b>DALY</b>	Disability-adjusted life years
<b>EWAR</b>	Early Warning and Response
<b>EBS</b>	Event-Based Surveillance
<b>COAG</b>	FAO Committee on Agriculture
<b>FAO</b>	Food and Agriculture Organization of the United Nations
<b>FBO</b>	Food Business Operators
<b>FSRisk</b>	Food Safety Risk Analysis Network
<b>FERG</b>	Foodborne Disease Burden Epidemiology Reference Group
<b>GLEWS</b>	Global Early Warning System
<b>GEMS/Food</b>	Global Environmental Monitoring and Assessment Programme
<b>GFN</b>	Global Foodborne Infections Network
<b>GIFT</b>	FAO/WHO Global Individual Food consumption data Tool
<b>HACCP</b>	Hazard Analysis and Critical Control Point
<b>IBS</b>	Indicator-Based Surveillance
<b>INFOSAN</b>	FAO/WHO International Food Safety Authorities Network
<b>IHR</b>	International Health Regulations
<b>IPPC</b>	International Plant Protection Convention
<b>IoT</b>	Internet of things
<b>JEE</b>	Joint External Evaluation
<b>JECFA</b>	Joint FAO/WHO Expert Committee on Food Additives
<b>JEMRA</b>	Joint FAO/WHO Expert Meetings on Microbiological Risk Assessment
<b>JMPR</b>	Joint FAO/WHO Meeting on Pesticide Residues
<b>LMICs</b>	Low- and middle-income countries
<b>M &amp; E</b>	Monitoring & Evaluation
<b>NCC</b>	National Codex Committee

■ <b>NGOs</b>	Nongovernmental organizations
■ <b>PVS</b>	Performance of Veterinary Services
■ <b>SPS</b>	Sanitary and Phytosanitary Measures Agreement
■ <b>SMEs</b>	Small- and medium-sized enterprises
■ <b>STDF</b>	Standards and Trade Development Facility
■ <b>SP</b>	Strategic Priority
■ <b>SDG</b>	Sustainable Development Goals
■ <b>TAG</b>	Technical Advisory Group
■ <b>UNEP</b>	United Nations Environment Programme
■ <b>v-TPA</b>	Voluntary third-party assurance
■ <b>WGS</b>	Whole genome sequencing
■ <b>WOAH</b>	World Organisation for Animal Health
■ <b>WASH</b>	Water, sanitation and hygiene
■ <b>WTO</b>	World Trade Organization





A photograph of a grocery store aisle with a purple overlay. A person's hand, wearing a black watch, is reaching for a package of vegetables. The shelves are stocked with various produce, including carrots and green beans. The word "INTRODUCTION" is written in large white letters across the center of the image.

# INTRODUCTION

## Why an updated Global Strategy for Food Safety?

**S**afe food is a primary determinant of human health. It is a basic human right to have access to safe, nutritious and healthy food. To guarantee this right, governments must ensure that available food meets safety standards. This task is not easy as the world is now more interconnected, and food systems are changing faster than ever. Foods are produced, managed, delivered and consumed in ways that could not have been anticipated two decades ago. These factors call for a fresh global approach to improve food safety that aims to strengthen national food safety systems while improving national and international collaboration.

While recognizing that food safety is a shared responsibility among multiple stakeholders, unsafe food and incapacity to properly address food safety events undermines public confidence in a country's food safety system and the responsible competent authorities. Governments must show leadership in adopting and implementing food safety policies that ensure that each stakeholder knows – and correctly plays – their part from prevention to response; otherwise, access to safe food for all will remain an elusive goal. Furthermore, economic disparities within and across countries, including marked differences in the strength of national food safety systems and complex dynamics within food systems, have significantly slowed progress towards achieving this goal.

Since its establishment in 1948, the World Health Organization (WHO) has had an unwavering commitment to reducing the burden of foodborne diseases (FBDs) on global health. WHO has provided leadership in assessing the global burden of FBDs and has helped countries build or strengthen national foodborne disease surveillance systems, advocating for control and prevention strategies at the national level through educational programmes and global awareness-raising activities. The work of WHO has ensured that the global food safety standards of the Codex Alimentarius are based on considerations of public health and that countries with limited capacities are able to participate in the work of Codex through capacity-building programmes. WHO has promoted international and national cooperation in setting and addressing the global food safety agenda. Over the lifetime of the Global Strategy for Food Safety 2002 (3) and the strategic plan for food safety (2013-2022) (4) there have been many incidents where WHO's intervention has assisted in bringing food safety crises under control, minimizing the associated public health concerns. However, there is a recognition that the food safety systems of many Member States face challenges. They need significant improvements in their key components such as regulatory infrastructure, enforcement and surveillance, food inspection and laboratory capacity and capability, coordination mechanisms to prevent and manage events, and food safety education and training. Additionally, there is a need to integrate food safety into national and regional health, agriculture, trade, environment and development policies.



@seventyfourimages

### Food Safety:

Assurance that food will not cause adverse health effects to the consumer when it is prepared and/or eaten according to its intended use (1).

### Competent authority:

The official government organisation or agency having jurisdiction. Throughout this document this usually means the competent authority responsible for food safety (2).



@ckstocphoto

In pursuit of continuous improvement in food safety, WHO was a partner in the First International Food Safety Conference together with the African Union (AU) and the Food and Agriculture Organization of the United Nations (FAO), which was held in Addis Ababa on 12–13 February 2019 (6). This Conference set out to identify food safety priorities, align strategies across sectors and borders, reinforce efforts to reach the Sustainable Development Goals (SDGs) and support the UN Decade of Action on Nutrition. In April 2019, the World Trade Organization (WTO) International Forum on Food Safety and Trade (7) met in Geneva and continued the discussions, addressing the trade-related aspects and challenges of food safety such as the use of new technologies, multi-stakeholder coordination and harmonizing regulation in a time of change and innovation.

The conclusions from both conferences were integrated into Resolution WHA73.5, “Strengthening efforts on food safety” (8) adopted by the Seventy-third World Health Assembly in 2020. This reaffirmed that food safety is a public health priority with a critical role in the 2030 agenda for Sustainable Development Goals. The resolution acknowledged that governments must act at the national, regional and global levels to strengthen food safety. It also called on Member States to remain committed at the highest political level to recognizing food safety as an essential element of public health; to develop food safety policies that take into consideration all stages of the supply chain, the best available scientific evidence and advice, as well as innovation; to provide adequate resources to improve national food safety systems; to recognize consumer interests; and to integrate food safety into national and regional policies on health, agriculture, trade, environment and development.

In turn, Member States requested that WHO update the Global Strategy for Food Safety to address current and emerging challenges, incorporate new technologies and include innovative approaches for strengthening national food safety systems.

This global strategy responds to the Member States’ request by outlining five interlinked and mutually supportive strategic priorities that arise from a situational assessment and an extensive consultative process. The strategy’s vision is that all people, everywhere, consume safe and healthy food so as to reduce the burden of FBDs. It also envisages more action towards building food safety systems that are forward-looking, evidence-based, people-centred and cost-effective, with coordinated governance and adequate infrastructures.

WHO, in collaboration with intersectoral partners, is more committed than ever to providing continued guidance and support to Member States to prioritize, plan, implement, monitor and regularly evaluate actions to continuously strengthen food safety systems and promote global cooperation. This strategy shares multiple strategic priorities with the current draft FAO Strategic priorities for Food Safety 2022–2031 in terms of strengthening food control systems, using evidence (data and science) to support decision-making, and promoting stakeholder engagement and partnerships. It is expected that current harmonization efforts will lead to the development of a joint implementation or coordination plan.

**Foodborne disease (FBD):** A disease commonly transmitted through ingested food. FBDs comprise a broad group of illnesses, and may be caused by microbial pathogens, parasites, chemical contaminants and biotoxins (5).



@Stevica Mrcija

## Development of the Global Strategy for Food Safety

WHO has developed the Global Strategy for Food Safety with the advice of the Technical Advisory Group (TAG) for Food Safety: Safer Food for Better Health,<sup>2</sup> WHO regional advisors in food safety, international partners, nongovernmental organizations (NGOs) and WHO Collaborating Centres. In developing this strategy, WHO has also taken into account the Regional Framework for Action on Food Safety in the Western Pacific (9), the Framework for Action on Food Safety in the WHO South-East Asia Region (10), the Regional Plan of Action for Food Safety of the Eastern Mediterranean Region (11), the Food Safety Programmes of the WHO African (12), European and Americas Regions, the standards, recommendations and guidelines of the Codex Alimentarius, and the FAO Food Safety Strategy (2022-2031).

To seek input, WHO organized two briefings with Member States, held a public web-based call for comments for the public, and engaged in regular meetings with FAO and the World Organisation for Animal Health (WOAH). Views from other UN agencies were gathered through an ad hoc virtual meeting and written feedback. The United Nations Environment Programme (UNEP), World Trade Organization (WTO), International Finance Corporation, World Bank, and United Nations Industrial Development Organization also provided valuable inputs to this strategy.

This strategy adds value to global health and Member States' efforts by providing an overall vision and strategic priorities for concerted global action in food safety. It underlines the critical role of this field in public health and the need for enhanced global cooperation across the whole food and feed chain to significantly reduce the burden of FBDs. The strategy also reflects and complements existing WHO health programmes and initiatives, such as nutrition, non-communicable diseases, antimicrobial resistance (AMR), public health emergency and emerging diseases, climate change, environmental health, water and sanitation, and neglected tropical diseases. Additionally, this strategy is expected to support the implementation of food safety commitments generated at the United Nations Food Systems Summit (13), particularly in the context of the coalitions for healthy diets, school meals and One Health.

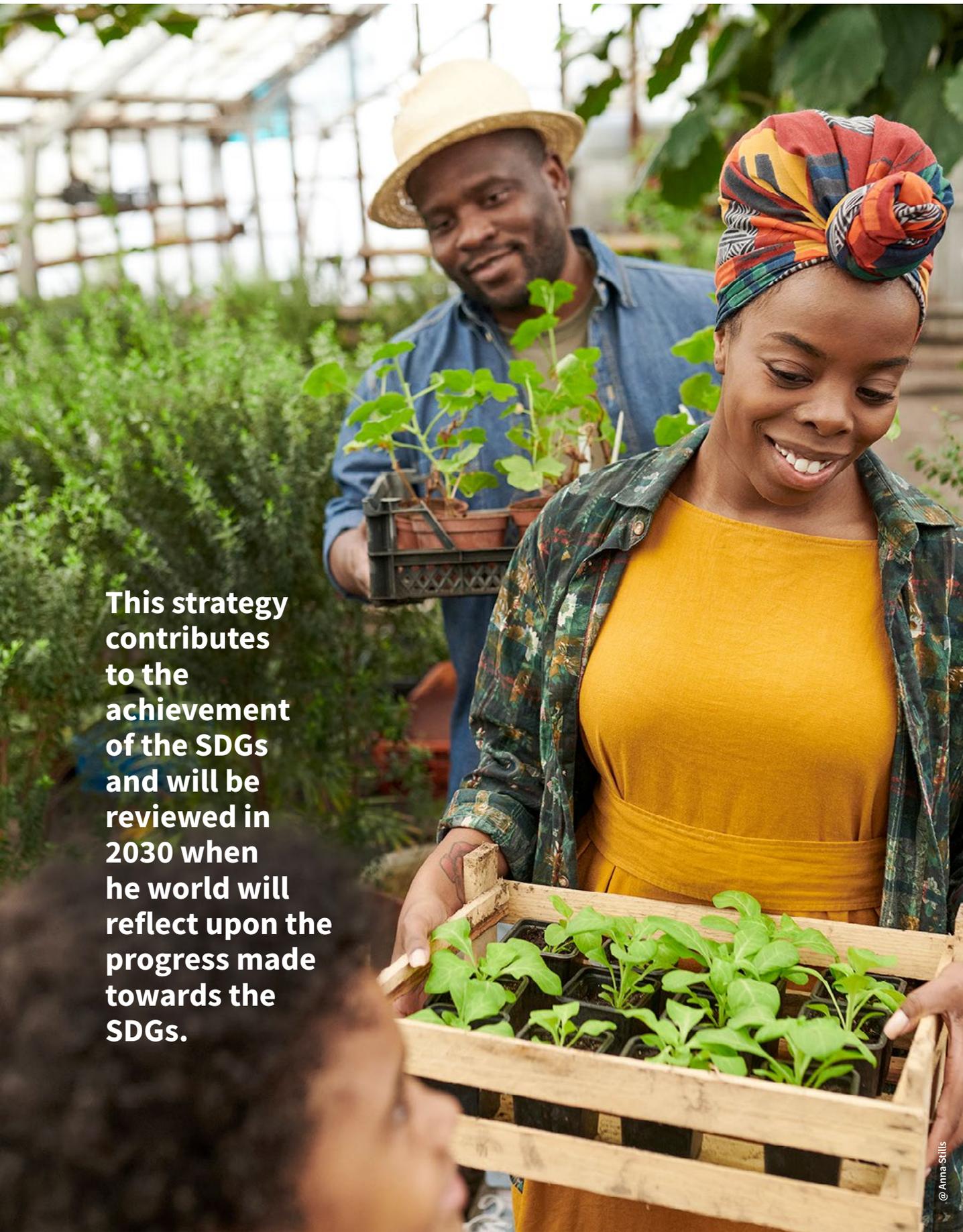
**Food business operator (FBO):** The entity responsible for operating a business at any step in the food chain (1).

## Target audience and timeframe

The target audience for this strategy includes policy-makers (national and subnational governments), technical authorities/agencies responsible for food safety, academia in public health and food safety, food business operators (FBOs) and private sectors, consumers, civil societies, UN agencies with a role in food safety and WHO staff.

<sup>2</sup> WHO Technical Advisory Group: Safer Food for Better Health. Geneva: World Health Organization (WHO). (<https://www.who.int/groups/technical-advisory-group-on-food-safety-safer-food-for-better-health/about>).

**This strategy contributes to the achievement of the SDGs and will be reviewed in 2030 when the world will reflect upon the progress made towards the SDGs.**



@ Anne Stills



# FOOD SAFETY TODAY

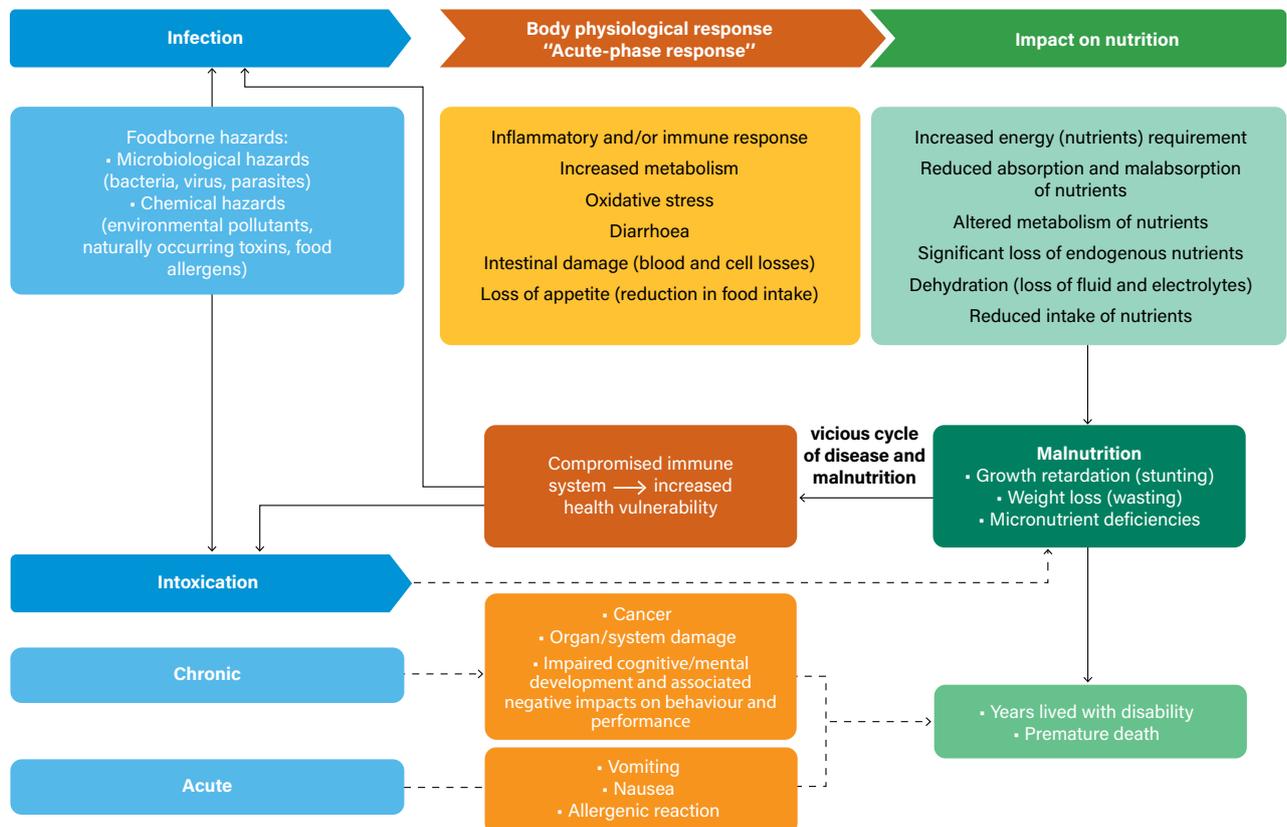


## Food safety: A public health and socioeconomic priority

Unsafe food containing harmful levels of bacteria, viruses, parasites, chemical or physical substances makes people sick, causing acute or chronic illnesses resulting from more than 200 diseases, ranging from diarrhoea to cancers to permanent disability or death. An estimated 600 million – almost one in 10 people in the world – fall ill after eating contaminated food, resulting in a global annual burden of 33 million disability-adjusted life years (DALY) and 420 000 premature deaths (5). Unsafe food disproportionately affects vulnerable groups in society, particularly infants, young children, the elderly and immunocompromised people. Low- and middle-income countries (LMICs) are the most affected, with an annual estimated cost of US\$ 110 billion in productivity losses, trade-related losses and medical treatment costs due to the consumption of unsafe food (5). Moreover, the globalisation of the food supply means that populations worldwide are increasingly exposed to new and emerging risks, such as the development of AMR in foodborne pathogens that is accelerated by the inappropriate use of antimicrobials, including misuse and overuse of antimicrobials in human, animal and plant health. It is estimated that by 2050, 10 million lives will be at risk and a cumulative US\$ 100 trillion will be lost due to the impact of AMR if no proactive solutions are taken (5).

Nutrition and food safety are closely interlinked and are essential for achieving positive health outcomes from food systems. Food must be safe, available, accessible, nutritious, culturally acceptable and ingested regularly for growth, health and well-being (14). Unsafe food increases infection and intoxication, creating a vicious cycle of disease, malnutrition and disability, particularly affecting vulnerable groups. Simply put, there is no food security and nutrition without food safety. Fig. 1 illustrates the close linkages between food safety and FBDs and their impact on human health and nutrition at the individual level.

**Fig. 1. Conceptual framework for foodborne hazards, nutrition and health nexus (15)**



Unsafe food negatively impacts health, but it also influences socioeconomic growth in agribusiness, trade and tourism. In 2019, the World Bank estimated the value of the global food systems to be approximately US\$ 8 trillion (16). LMICs are increasingly participating in the global food trade, both as exporters and importers. At the same time, global agri-food value chains have become complex, and food products are often grown, processed and consumed in different countries. While these trends have contributed to increasing the quantity and diversity of foods available to consumers worldwide, food safety risks have also increased and spread with the larger volumes of traded foods. Consumers have the right to expect that both domestically produced and imported food are safe. Thus, the development of international food safety standards for application at domestic levels and in international trade has become more critical than ever before. Without prevention-oriented food safety risk management systems, failure to ensure compliance with regulations and standards will lead to economic losses and a loss of confidence in business and assurances provided by government authorities. If producers fail to ensure compliance, they risk being denied access to high-value markets, resulting in expensive export rejections and damage to brand reputation. Failure to address food safety impacts the growth and modernization of domestic food markets, thus diminishing income and employment opportunities. For countries wishing to develop tourism, confidence in the safety and quality of food can reinforce tourism attraction, while uncertainty around food quality and safety could impede economic growth.

## Food safety: An integral part of the Sustainable Development Goals

The SDGs are a call for action by 193 countries to promote prosperity while protecting the planet. They provide a blueprint for achieving a better and more sustainable future for all. The 17 Goals are interconnected and are to be collectively achieved by 2030. Sufficient, safe and nutritious foods are clearly identified as relevant to all SDGs, reaffirming the interdependence between health and well-being, nutrition, food safety and food security. Food safety must be incorporated into the realisation of the SDGs (Fig. 2), especially SDG 2 (Zero hunger), SDG 3 (Good health and well-being) and SDG 8 (Decent work and economic growth). But food safety must also be integrated into achieving SDG 1 (No poverty), SDG 12 (Responsible consumption and production), and SDG 17 (Partnerships for the goals) (17). Additionally, SDG 6 (Clean water and sanitation) is a cornerstone of food safety. Food safety plays an integral role in achieving these SDGs, which are unlikely to be attained without adequate, safe and healthy food, particularly for domestic consumers in LMICs.



**Fig. 2. Food safety is fundamental to SDG 1, 2, 3, 6, 8, 12 and 17**



**SDG 1: End poverty.** Economic losses associated with unsafe food go well beyond human suffering. Losses in household income and medical care costs due to FBDs will have major ramifications for families in LMICs. Rejection of food exports in international markets can result in severe economic losses. An unsafe food supply will hamper socioeconomic development, overload health care systems, and compromise economic growth, trade and tourism.



**SDG 2: End hunger.** Unsafe food creates a vicious cycle of disease and malnutrition, which can lead to long-term developmental delays in children. Achieving food security, improving nutrition and promoting sustainable agriculture can only be achieved when food is safe for people to eat.



**SDG 3: Good health and well-being.** Unsafe food accounted for 33 million DALYs in 2010. Every year more than 600 million people fall ill and 420 000 die from eating food contaminated with biological and chemical agents. The most vulnerable people in society are the poor, as well as infants, pregnant women, the elderly, and those with compromised immunity.



**SDG 6: Clean water and sanitation.** Billions of people worldwide, particularly those living in rural areas in developing countries, do not have access to clean drinking water and sanitation. Safe food production and preparation relies on sanitation, hygiene and adequate access to clean water which are essential for preventing and containing FBDs.



**SDG 8: Decent work and economic growth.** The agriculture and agri-food sectors are the mainstay of employment in LMICs and a major driver of sustainable economic development and poverty reduction. Traditional food markets form part of the social fabric of communities and are an important source of livelihoods for millions of urban and rural dwellers. As such, unsafe food can cause economic loss and increase the unemployment rate in agri-food sectors.



**SDG 12: Sustainable consumption and production.** There is a fundamental need to change the way that our societies produce and consume goods and services. Governments, relevant international organizations, the private sector and all stakeholders must play an active role in changing unsustainable consumption and production patterns and promote social and economic development that supports the health of people and the environment.



**SDG 17: Partnerships for the goals.** The COVID-19 crisis has demonstrated that the role of partnerships to deliver sustainable, inclusive and resilient development is more essential and urgent than ever. This crisis has demonstrated the limitations of government in every country in the world and the vital need for multi-stakeholder collaboration to collectively build more inclusive, resilient and sustainable societies.

## Drivers of change in food safety

Many national governments have recognized unsafe food as a major social cost. It threatens public health, produces inefficiencies in animal and plant production systems, and creates trade barriers across the global food web (18). There are several drivers of food safety. These, along with their present and future implications on food safety, are described below and summarized in Fig. 3. While it is not always possible for government agencies with responsibilities for food safety to control all the drivers of change when strengthening food safety systems, it is important to be aware of them so they can be considered, and ideally managed, into the overall design of the system.

### Interests and demands for safe food



There is a growing awareness worldwide of the need to strengthen national food safety systems to improve the protection of public health and gain trust and confidence in the safety of the food supply to facilitate food trade (19). Stakeholders are demanding that national governments provide strong leadership in response to current and emerging food safety challenges. They should provide adequate financial, educational and technical resources at appropriate levels for improving systems to ensure food safety across the entire food and feed chain while understanding that FBOs bear the primary responsibility to produce safe food. Unsafe food undermines public confidence in the national food safety system and the responsible competent authorities.

### Global food safety threats

Many food safety events and emergencies have resulted in national and global changes in food systems, food supply chains and food safety regulations. Examples of such events include variant Creutzfeldt-Jakob disease causing bovine spongiform encephalopathy in cattle, adulteration of infant formula with melamine, dioxin contamination of animal feed and multi-country outbreaks of Shiga toxin producing *Escherichia coli* (STEC) and hepatitis A associated with contaminated seed sprouts and frozen berries respectively. All the aforementioned examples provoked changes in food systems and regulations. Additionally, a global public health focus on AMR and recognition of the potential of the food and agricultural production system as a contributing factor is already resulting in shifts in agricultural practice, improved intersectoral collaboration, surveillance and data sharing, and exploration of regulatory requirements for the future.

### Global changes and their impact on the food supply chain

Interconnected national food systems and food value chains continually undergo changes in supply and production costs, some of which aggregate into global trends in food movements. For instance, the entry of new high-value foods into the market can create a strong incentive for food fraud. Though food fraud mainly undermines food quality, it can result in a food safety issue if unsafe ingredients or substitutions are added to the food. Extended and complex global food supply chains and food ingredients increase the risk of intentional contamination and pose new challenges for traceability and authenticity of foods.

**Event:** the International Health Regulations (IHR) (2005) define an event as “a manifestation of disease or an occurrence that creates a potential for disease (which can include events that are infectious, zoonotic, food safety, chemical, radiological or nuclear in origin and whether transmitted by persons, vectors, animals, goods/ food or through the environment) (20). Food safety events mean incidents and emergencies.

## Environmental challenges

Climate change poses real challenges and is a highly relevant driver of existing and emerging food safety risks. Increasing temperatures that cause ocean warming and acidification, severe droughts, wildfires, altered precipitation patterns, melting glaciers, rising sea levels and extreme weather events negatively affect our food systems. Some of the food safety issues associated with climate change that are likely to result in increased risks are the emergence of existing and new foodborne pathogens and parasites, increase in the incidence of harmful algal blooms, increase in the incidence of mycotoxins and of heavy metals, particularly methylmercury in the environment resulting from melting glaciers (23). Furthermore, inappropriate use and overuse of agri-chemicals in crop production may lead to environmental and food contamination. Environmental threats and impacts in the food chain pose serious risks to food systems.

Compared with other food categories, fresh fruits and vegetables are more frequently involved in food safety incidents involving microbiological hazards around the globe. One of the contributing factors is that the waste from intensive livestock production is used as soil conditioners. Irrigating crops with contaminated/untreated wastewater can result in human illness when plants – such as fresh leafy vegetables or ready-to-eat, minimally processed fruit/vegetables – are contaminated and not subject to post-harvest disinfection.

Food waste and losses from unsafe food also burden waste management systems and exacerbate food insecurity. Globally over 17% of food is wasted, which is associated with up to 10% of global greenhouse gas (24). Food waste from households, retail establishments and the food service industry totals 931 million tonnes annually (25). A key target of SDG 12 is to halve food waste and reduce food loss by 2030.

Additionally, plastic waste in the form of nano- and microplastics may become a global health concern in the future as it has the potential to enter/re-enter in the food systems from different environmental sources (26).

## Society: Changing expectations and behaviour around food

Social megatrends are a common phenomenon in today's interconnected world. Shifts in consumer preferences, purchasing trends and expectations are rapidly changing the production and distribution of certain foods (e.g. demand in some populations for organic, fresh and less processed foods and demand for alternative protein sources). Moreover, new business models, including e-commerce and food deliveries, are emerging to meet the needs of consumers. From the communication side, social media platforms provide new opportunities for risk communication and education regarding food safety. However, the difficulty in distinguishing facts from misleading information can lead to a loss of consumers' trust in food sectors and governments.

### Food fraud:

any suspected intentional action committed when an FBO intentionally decides to deceive customers about the quality and/or content of the food they are purchasing in order to gain an undue advantage, usually economic gains, for themselves (21).

### Food defense:

is the effort to protect food from an intentional act on a food system, such as on product, processing plant or farm, which is intended to pose a public health threat, such as malicious tampering or terrorism (22).



@Stevica Mrođja

## Rise of new technologies and digital transformation

The pace of innovation in food and agriculture is increasing, bringing significant economic advantages to food production and benefits to consumers through increased product choice and a reduction in food waste. Novel plant and animal breeding methods involving genetic editing offer the potential for developing species with new traits, such as disease resistance and drought tolerance. Nanotechnology applications in the food sector can lead to improvements in nutrients, bioactive delivery systems and novel food packaging materials, which can extend the shelf-life of foods. Alternative food proteins such as meat, egg, fishery or dairy products that are plant-based, cultivated or fermentation-derived and other new food sources, including food product reformulation, can improve consumer options and sustainability. However, new technologies for food production must be fully assessed from a public health point of view before products are placed on the market. In this regard, the Codex Alimentarius will play a key role in addressing the emerging and critical issues related to the usage of new technologies in a timely manner. Some new technologies require considerable investment in research and development and may be out of the reach of lower-income countries, which would create an equity gap in innovation and ability to detect hazards.



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Digital innovation and transformation in the context of big data and analytics, artificial intelligence and the internet of things (IoT) are trends that are rapidly changing food systems. For example, genomics and related tools – such as whole genome or next generation sequencing and international sharing of data relevant to FBDs – enable more precise, focused investigations, including pathogen detection, characterization, identification, and source tracking.

## Demographic changes

Demographic changes, including urbanisation, population growth and ageing, are all drivers of change for food systems. Food safety is of critical importance with the growth of the global population and changing socio-demographics. The global population is expected to reach 9.7 billion by 2050, with growth taking place mainly in sub-Saharan Africa and Central and Southern Asia (27). Foodborne pathogens have a disproportionate impact on children under the age of five, particularly if they suffer from malnutrition because their immune systems have a limited ability to fight infections.

Virtually every country in the world is experiencing growth in the number and proportion of older persons in their population. Older people may be more susceptible to foodborne hazards due to age-related weakened immune systems. The challenge for national food safety systems is to identify at-risk population groups and develop specific risk management measures for these groups, while communicating the importance of safe and healthy diets at large scale.

Urbanisation is one of the main drivers in shaping a country's food systems. Today, half of the world's population lives in cities or towns located upon 3% of the Earth's surface. By 2050, over 65% of the global population will be urban dwellers (28). Cities, with their high population density, are particularly vulnerable to food safety emergencies, and many cities in low-income countries do not have adequate capacity to address disruptions to the food supply. The risk is particularly high for people living in congested and overcrowded informal urban settlements where sanitary conditions are already inadequate/unsuitable for human living. Additionally, the socioeconomic pressures within urban settings also

push the growth of informal food sectors but without necessary oversights and supports from governments. The lack of availability concerning critical basic infrastructure, such as distribution services, hygiene and sanitation facilities, food storage equipment needed for food safety also poses additional risks for the accessibility of safe food in urban settings, especially in LMICs. These issues highlight the need for competent authorities and other national agencies with responsibility for food safety to develop contingency plans for food safety emergency management. The COVID-19 pandemic is disrupting urban food systems worldwide, posing several challenges for cities and local governments coping with rapid changes in food availability, accessibility and affordability – which strongly impact the food security and nutrition situation of urban populations. Fig.3 summarizes the drivers of change, their consequences and the implications for food safety.

**Fig. 3. Drivers of change and their implications on food safety**

Drivers	Consequence	Food safety implications
Interests and demands for food safety	Increased attention and resources on food safety	<ul style="list-style-type: none"> <li>Improved protection of consumers</li> <li>Reduced risks from unsafe foods</li> <li>Greater trust and confidence in national food control systems</li> </ul>
Global food safety threats	Multinational food safety emergencies	<ul style="list-style-type: none"> <li>Improved food safety legislation and control measures</li> </ul>
Global changes and their impacts on the food supply chain	Extended and complex global supply chains	<ul style="list-style-type: none"> <li>Higher risks of intentional contamination and adulteration of food</li> <li>More challenges to traceability and recalls</li> </ul>
Environmental challenges	Accelerating climate change, increased agricultural waste, and environmental pollution	<ul style="list-style-type: none"> <li>Increased likelihood of transmission of certain foodborne pathogens and levels of certain chemical contaminants</li> <li>Higher risks of environmental pollution into the food chain</li> </ul>
Society: changing expectations and behaviour around food	Changes in consumer purchasing patterns, new business models, and communication platforms	<ul style="list-style-type: none"> <li>Increased food control challenges associated with new commercial trends</li> <li>New challenges for risk communication to tackle misinformation on social media platforms</li> </ul>
Rise of new technologies and digital transformation	Novel food ingredients, production and analytic methods	<ul style="list-style-type: none"> <li>Increased demand for risk assessment on novel foods and the application of new technologies to food production</li> <li>New solutions for prevention and control of food safety risks</li> </ul>
Demographic changes	Population growth, ageing societies, and urbanisation	<ul style="list-style-type: none"> <li>Higher proportion of vulnerable groups for food safety risks</li> <li>More challenges to provide safe and healthy food for a growing population</li> </ul>



@Composter-box



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@Uladzimirz

## Food safety: A holistic approach

### Food safety and the One Health approach

It is now widely recognized that human health is closely connected to the health of animals, plants, and our shared environment (Fig. 4). With rapid population growth, globalisation and environmental degradation, threats to public health have become more complex. Chemical contaminants, naturally occurring toxins and residues of agri-chemicals, in addition to foodborne pathogens, such as Shiga-toxin producing *Escherichia coli* (STEC), *Listeria monocytogenes* and *Salmonella* can be rapidly distributed in the global food chain as has occurred over the past decade. The COVID-19 pandemic has shown how vulnerable the global population is to the undetected emergence of new diseases, particularly diseases that impact the food supply chain and global food systems. Wildlife trade and encroaching on wildlife habitats contribute to increasing the risk of the emergence of new zoonotic diseases and the inappropriate use of antimicrobials in livestock systems contributes to the increasing AMR. Mitigation of these threats cannot be achieved by one sector acting alone. Emerging health risks must be evaluated and addressed using a multi-sectoral approach engaging experts in human health, veterinary medicine, environment, agriculture, wildlife, plant health, microbiology and epidemiology, among others.

The One Health approach goes beyond the detection and control of emerging diseases. Future improvements in food safety and public health will largely depend on how well multiple sectors collaborate, coordinate and share information.

Without knowledge of the incidence and burden of disease associated with hazard/food combinations, prioritization of mitigation action will be difficult and food safety improvements will be sub-optimal.

Data on occurrence and disease burden from foodborne hazards combined with knowledge of source attribution – chemical, microbiological, physical – will be crucial in assessing costs and benefits of current and novel control measures.

**Fig. 4. One Health approach: Tackling health risks at human-animal-environment interface** (29)



Therefore, an effective surveillance system to address FBDs requires the integration of human and animal disease surveillance with food systems monitoring.

Additionally, climate change as an influencing factor of food systems is likely to have a considerable negative impact on food security, nutrition and food safety. By modifying the persistence and transmission patterns of foodborne pathogens and contaminants, climate change leads to the escalation of foodborne risks. In this regard, food safety should also be integrated into interventions and commitments for climate change adaptation and mitigation.

Adopting a One Health approach to food safety will allow Member States to detect, prevent and respond to emerging diseases at the human-animal-environment interface so as to address food-related public health issues more effectively.

### The concepts of a food safety system and a food control system

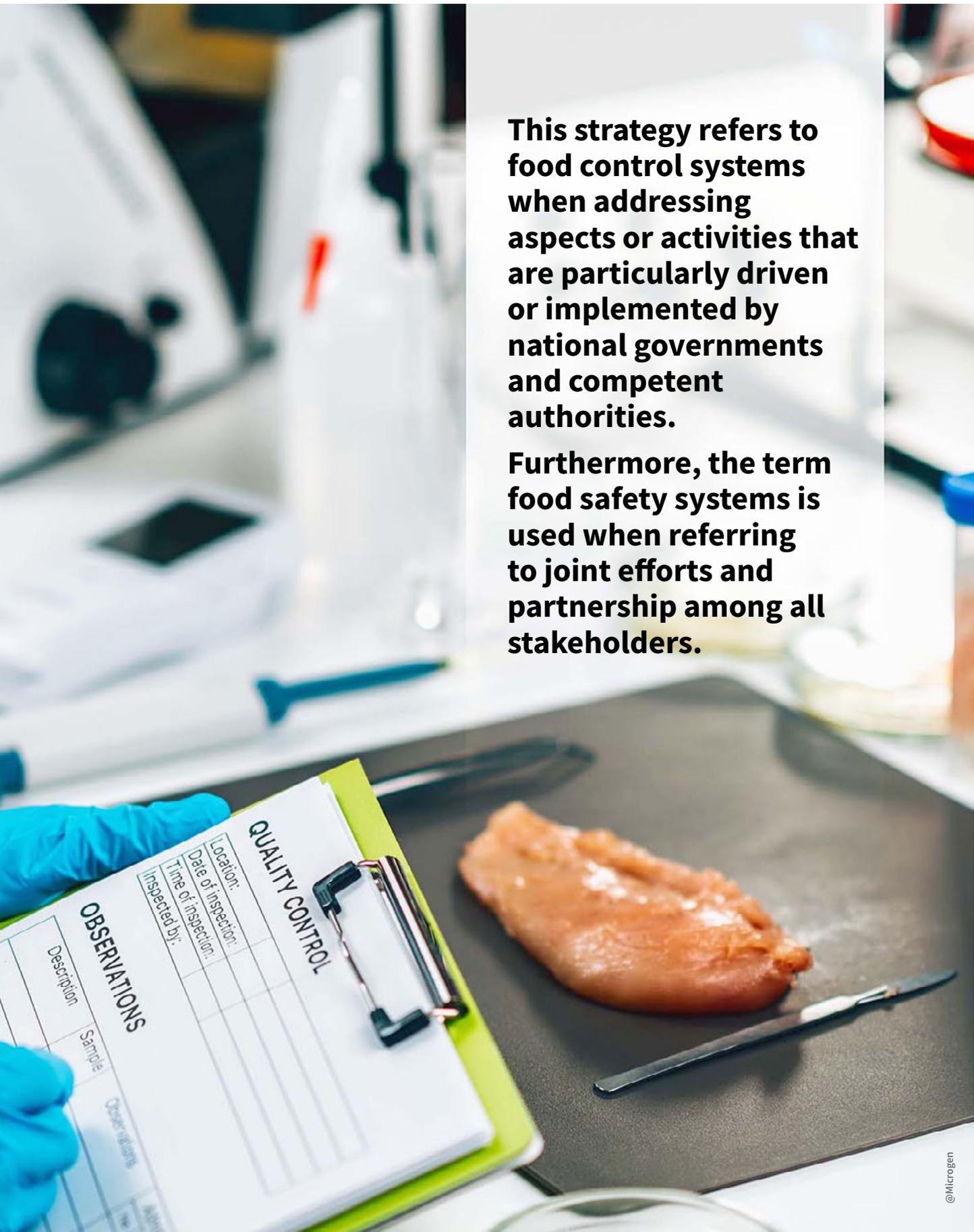
Food safety systems embrace the entire range of actors and their interlinked activities throughout the food and feed chain aiming at improving, ensuring, maintaining, verifying and otherwise creating the conditions for food safety. These actors include national competent authorities, the private agri-food sector, consumers, academia and any other stakeholders as relevant to the broader context in which they implement their activities in food safety.

According to the Codex Alimentarius Commission, national food control systems provide a critical contribution to food safety systems. As outlined in “Principles and guidelines for national food control systems” (CXG 82-2013) (30), the objective of a national food control system is “to protect the health of consumers and ensure fair practices in the food trade.” This foundational Codex Alimentarius text underlines the pivotal role of competent authorities and provides principles and a framework for the design and operations of national food control systems.

Though food control systems include both mandatory and non-mandatory approaches, including the interactions between competent authorities with other relevant stakeholders, the concept focuses especially on the role of competent authorities.

The term food safety system is used in this strategy in the context of the outcomes of the two high-level international food safety conferences in 2019 co-hosted by the AU, FAO, WHO, and WTO, which informed the WHA73.5 resolution, “Strengthening efforts on food safety”. Food safety systems encompass the combination of activities of all stakeholders in the food and feed chain that contributes to safeguarding the health and well-being of people.





**This strategy refers to food control systems when addressing aspects or activities that are particularly driven or implemented by national governments and competent authorities.**

**Furthermore, the term food safety systems is used when referring to joint efforts and partnership among all stakeholders.**

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A buffet line with various food trays. The top tray contains shredded yellow cheese. The middle tray contains diced potatoes, tomatoes, and green herbs. The bottom tray contains a vegetable salad with green herbs, tomatoes, and other vegetables. There are also trays with other items like a white sauce and small round items.

# GLOBAL STRATEGY FOR FOOD SAFETY

## Aim and vision

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The Global Strategy for Food Safety has been developed to guide and support Member States in their efforts to prioritize, plan, implement, monitor and regularly evaluate actions towards the reduction of the burden of FBDs by continuously strengthening food safety systems and promoting global cooperation.

The strategy's vision is all people, everywhere, consume safe and healthy food so as to reduce the burden of FBDs. This strategy gives stakeholders the tools they need to strengthen their national food safety systems and collaborate with partners around the world.

## Scope

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Strengthening national food safety systems begins with establishing or improving critical infrastructure and components of food control systems as described in Strategic Priority 1. For example, this can include developing the enabling framework of food legislation, standards and guidelines, laboratory capacity, human resources capacity, food control activities and programmes, and emergency preparedness capacity, as illustrated in Fig. 5.

In addition to having legislation, policy, institutional framework and control functions in place, Member States need to consider and adopt four important characteristics/principles for the system to be more effective:

**Forward-looking.** This principle is reflected as **Strategic Priority 2:** Identifying and responding to food safety challenges resulting from global changes and transformations in food systems. The global changes and transformation that food systems are experiencing today and that are predicted to occur in the future will have implications for food safety. Therefore, food safety systems should be equipped to identify, evaluate and respond to existing and emerging issues. The food safety systems must be transformed from reactive to proactive systems, especially when addressing health risks emerging at human-animal-ecosystems environment interface.

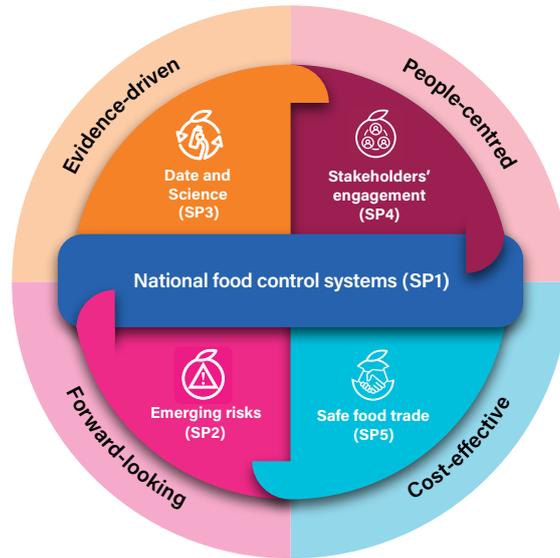
**Evidence-based.** This principle is reflected in **Strategic Priority 3:** Increasing the use of food chain information, scientific evidence, and risk assessment in making risk management decisions. Food safety risk management is based on science. The collection, utilization and interpretation of data lay the foundation for building evidence-based food safety systems.

**People-centred.** This principle is reflected as **Strategic Priority 4:** Strengthening stakeholder engagement and risk communication. Food safety is a shared responsibility, and it requires a joint effort by all stakeholders in food systems. Successfully ensuring food safety from farm to fork requires a more inclusive approach with all stakeholders, including empowered consumers and FBOs.

**Cost-effective.** This principle is reflected as **Strategic Priority 5:** Promoting food safety as an essential component in domestic and international food trade. Food safety is a complex issue that is influenced by socioeconomic status. With the globalisation of food trade, foodborne pathogens and diseases can travel across borders and cause significant health and economic impacts. To ensure increased access to safe food in both domestic markets and international trade, food safety systems should be cost-effective for implementation at all levels (domestic markets, imports, and exports). Food safety systems should be more cost-effective for both importing and exporting countries while enhancing food safety in the domestic market.

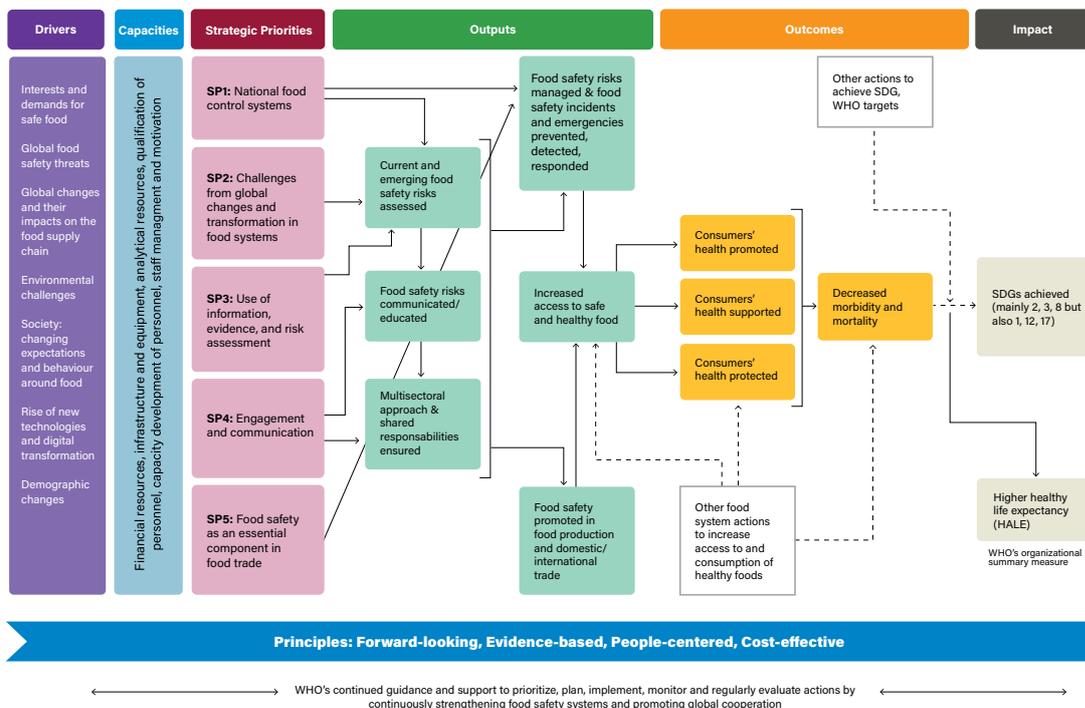
The Global Strategy for Food Safety's five strategic priorities are based on the fundamental components/infrastructure of the food safety systems and the above four principles, as shown in Fig. 5.

**Fig. 5. Conceptual framework for strategic priorities**

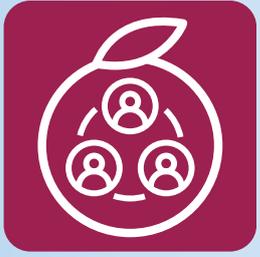


The theory of change for the Global Strategy for Food Safety (Fig. 6) presents the connection between the drivers, capacities, strategic priorities, outputs, outcomes and the desired impact. It depicts its expected contribution to the SDGs, particularly SDG 2, SDG 3 and SDG 8, by continuously improving food safety systems. In Fig.6, continuous lines mean direct relation and dashed lines mean indirect relation among the components. The impact and consequences of drivers are detailed in Fig. 3.

**Fig. 6. A path towards safe and healthy food for all**







# STRATEGIC PRIORITIES



## Strengthening national food control systems

### STRATEGIC PRIORITY 1

#### Aim

Competent authorities are able to establish and strengthen national food control systems by evaluating and improving key components that will contribute to reducing the burden of FBDs.

#### Why strengthen national food control systems?

National food control systems play a pivotal role in protecting the health of consumers and ensuring fair practices in trade at both the national and global level. When governmental policies neglect food safety, it can result in high health, social, economic and environmental costs that impede the achievement of the SDGs. Regular review and strengthening of national food control systems throughout the farm-to-fork food system continuum is essential for effective management to ensure food safety. National food control systems are central to the prevention and control of FBDs.

Countries have the flexibility to determine how best to design their food control systems and implement a wide range of control measures. The Codex Alimentarius Principles and Guidelines for National Food Control Systems will assist Member States in reviewing and strengthening their national systems (30). While different legislative arrangements and structures can apply, the system should be sufficiently flexible to allow for modifications over time as national conditions evolve. Above all, the food control systems should always be fit-for-purpose, resources efficiently applied, and consumers' health and economic interests well protected. The expected goals and outcomes from the national food control systems should be articulated in a national food safety strategy (or health security or food and nutrition strategies, depending on national circumstances) with regular measurement and demonstration of performance of the food control systems as an important component.

When setting and implementing regulatory requirements, the national food control systems should consider the whole food chain and take a risk-based approach. The current climate of accelerated globalised trade, increased linkages between food systems and national food control systems between countries presents both challenges and opportunities. They demand in response that national food control systems are focused, responsive, capable, flexible and fit-for-purpose. No matter how well established a system, regular review, adjustment and continuous improvement are essential.



In addition to the norms set down in the guideline of the Codex Alimentarius (CXG/GL 82-2013), strong and resilient food control systems are expected to have addressed or contain the components or elements outlined in Fig.7:

**Fig. 7. Components of a National Food Control System**

A strong policy and regulatory framework

Standards and guidelines aligned with those of the Codex Alimentarius, and the OIE, where relevant

Adequate resources to support the programme

Shared responsibility, coordination and communication amongst all stakeholders

Effective risk-based operational management of food controls along the entire food and feed chain

Scientific capacity to conduct risk assessment, including laboratory capability

Data and information collection/generation to support risk-based control measures

Food safety emergency response plans

International connectivity and collaboration

Food safety communications and education, including staff competence and training

Performance monitoring for periodic review and continuous improvement

Some Member States will have well established national food control systems while others are in the process of establishing or strengthening them. It is recommended, however, that Member States adopt a strategic stepwise approach to strengthening their national food control systems, where appropriate, using the following six strategic objectives.

### **Strategic objective 1.1: Establish a modern, harmonized and evidence-based framework of food legislation**

In strengthening the national food controls, governments should ensure that these are founded on a sound legislative and policy base, including the clear articulation of goals and objectives, expected outcomes and performance evaluation frameworks. As different government agencies may be responsible for promulgation of food legislation, it is important to ensure that such legislation is harmonized nationally. Modern food legislation frameworks combine traditional final product testing and vertical (product-specific) food regulations with an evidence-based risk management approach and horizontal regulations<sup>2</sup> (general rules addressing common aspects for a broad range of foodstuffs) to ensure a more effective and efficient approach to food safety.

The structure and objectives of the national food controls should be fully described in legislation, together with the roles and responsibilities of all national, subnational and local competent authorities. The national food controls should include a system for coordination of functions of all the competent authorities across the entire food chain. Subject to the rights and obligations under the WTO Agreements, and in particular the World Trade Organization's Agreement on Sanitary and Phytosanitary Measures (SPS Agreement), national food regulations and standards should reflect, to the extent possible, the Codex Alimentarius standards, guidelines and recommendations. Legislation should include provisions for food inspections to be carried out regularly by competent authorities on the basis of an evidence-based risk management approval and with appropriate frequency to verify compliance of FBOs. The obligations for FBOs, who bear the primary responsibility of producing safe food, should also be clearly defined in law; this includes the responsibility to develop and implement evidence-based food safety risk management systems for each of their operations. Powers to monitor and enforce compliance should sit alongside dissuasive sanctions. A systematic process should be in place to review and update the national food controls as required, including consultation with affected stakeholder groups when significant changes in regulation are proposed.



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### **Strategic objective 1.2: Establish an institutional framework to coordinate the work of different competent authorities that manage national food control systems**

Effective national food controls require operational coordination at the national level. Within most countries, responsibilities for food safety are usually spread across several ministries, institutions or departments. National governments therefore face a key challenge in coordinating the functions of different agencies across the entire food chain, at local, regional and national level, and to ensure impartiality and the absence of conflicts of interest.

In strengthening the national food controls, it is essential to develop a structure – defined in legislation – for the oversight and operation of the system. The responsibilities, powers, goals and objectives of each constituent part of the system, along with agreed operational

<sup>2</sup> There are horizontal and vertical food laws. Horizontal laws apply to all foods, such as food labelling regulations and regulations governing food contact materials. Vertical food legislation applies to specific products, such as infant formula regulations and regulations that apply to the growing and harvesting of molluscan shellfish.

procedures should be defined. Effective coordination between the national, subnational and local levels is fundamental to success. Coordination should also include the work of any third party to which control tasks are delegated. Overlap and duplication of effort should be avoided. All parts of the system should be subject to regular audit and review.

Each country should design a coordination process that is appropriate to the national setting, across all levels (national, subnational and local) of competent authorities. There is no single coordination mechanism that applies in all countries. Some have consolidated responsibility in a single agency; others have put commissions or coordinating bodies in place. What matters is that there is a single vision for food control, good communication, defined roles for all competent authorities and clear expectations, preferably recorded in a transparent national food control plan.

### **Strategic objective 1.3: Develop and implement fit-for-purpose standards and guidelines**

Control measures will need to be tailored to the specific circumstances operating at the country level. In particular, the implementation of control measures must be proportionate and take account of the nature and extent of food business operations, in particular in small- and medium-sized enterprises (SMEs). In many cases, Codex standards, guidelines and codes of practice will provide robust benchmarks for design of country-level control measures. In the past, food safety standards were often prescriptive in nature, unnecessarily limiting innovative methods of food production and processing, restricting cost-effective compliance, and not fully addressing new and emerging food safety risks. Drawing on science and evidence-based technical and economic knowledge, standards and guidelines in modern national food controls should be flexible in design and implementation, as long as they achieve intended food safety outcomes.

### **Strategic objective 1.4: Strengthen compliance, verification and enforcement**

One of the primary functions of national competent authorities is to verify that FBOs comply with food legislation. Competent authorities should monitor and verify that the relevant requirements of legislation are fulfilled by FBOs at all stages of production, processing and distribution. Competent authorities should have enough suitably qualified and experienced staff and possess adequate facilities, financial resources and equipment to carry out their duties properly. Staff should be free of any conflicts of interest.

The frequency of food control verification activities should be regular, cost-effective and proportionate to the risk. They should consider the results of the checks carried out by FBOs under food safety management systems or quality assurance programmes based on Hazard Analysis and Critical Control Points (HACCP), where such programmes are designed to meet requirements of food legislation.

Additional targeted verification activities should be carried out in cases of non-compliance. Competent authority staff should be proficient in inspection, audit and investigation techniques and they should be trained commensurate with their work activities. Control programmes should extend to cover the operations of online aspects of food businesses, internet-based food traders, as well as the use of digital marketplaces. Additionally, traditional food markets and informal street food settings should also be included under the scope of food controls to ensure these settings have adequate hygiene and sanitation infrastructures and measures in place to meet food safety and public health requirements. Compliance with control measures should be recorded and operators provided with reports, particularly in cases of failure or non-compliance. Enforcement actions should be proportionate, effective, documented and transparent (30).



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**Food safety management system:** A systematic risk-based approach to controlling food safety hazards within a food business utilizing HACCP principles to ensure that food is safe to eat.

### Strategic objective 1.5: Strengthen food monitoring and surveillance programmes

Food monitoring and surveillance systems are essential components of the national food control programme. These should be structured and based on factors such as known and emerging risks, volumes of food produced or imported, legal compliance, and intelligence from disclosures or alert systems. Sampling and analytical testing can be both random and targeted.

Competent food laboratories are critical to successful monitoring programmes. As laboratories require considerable initial and ongoing capital investment, access and capacity should be commensurate with identified priority food risks. Laboratories involved in the analysis of food samples should be operated in accordance with internationally approved procedures or criteria-based performance standards and use methods of analysis that are, as far as possible, validated. Where government food laboratories do not have the capacity to conduct specific types of food analysis, private food laboratories may be designated as official food control laboratories by the national competent authority provided these laboratories are accredited to international standards.



Surveillance of FBDs and AMR in the human population is essential for monitoring the safety of the food and feed supply chains. Identifying outbreaks, estimating the burden of illness, and monitoring epidemiological trends and modes of transmission are key responses. The prevention and control of FBDs is a central objective of the national food control system. WHO has issued several guidance and technical tools to support Member States to strengthen their capacity in foodborne disease surveillance. These documents (31) also explain available epidemiological and laboratory technology that can be used in food safety. For example, whole genome sequencing (WGS) provides the highest possible microbial subtyping resolution currently available to public health authorities for the surveillance of – and response to – foodborne disease (32). Used as part of a surveillance and response system, WGS has the power to increase the speed with which threats are detected and the detail in which the threats are understood, and ultimately leads to quicker and more targeted interventions. Given its power, all countries are encouraged to explore how the technology can be used to improve their surveillance and response systems.

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Generally, the responsibility of food monitoring, the surveillance of human diseases (including FBDs), and the surveillance and control of zoonoses and wildlife often lies in different ministries. In addition to monitoring and surveillance of foodborne pathogens, it is essential to monitor the food supply for chemical contaminants, such as heavy metals (e.g. cadmium, lead or mercury); naturally occurring toxins, such as marine algal toxins, mycotoxins or natural plant toxins; residues of pesticides and veterinary medicines; environmental contaminants such as dioxins, organochlorines or hydrocarbons; and food additives and food allergens.

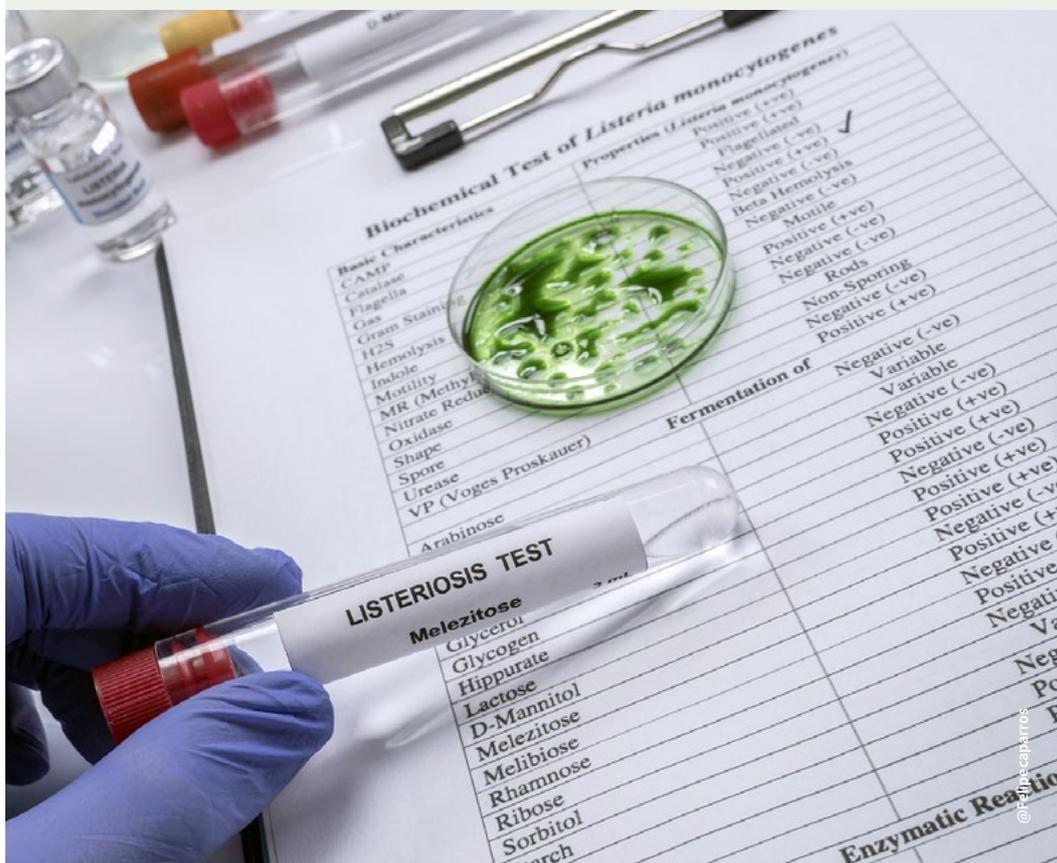
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As mentioned, it is important to establish a multisectoral One Health coordination mechanism, which facilitates integration and cooperation between all sectors, and enables the identification of early warning of food safety emergencies and the proactive introduction of preventative measures. The integrated surveillance of AMR (33) is one example of integrated collaboration that builds on One Health coordination mechanisms.

**Strategic objective 1.6: Establish food safety incident and emergency response systems**

The management of food safety incidents and emergencies is rarely the responsibility of a single national authority, and timely and coordinated collaboration among all partners is required to ensure effective responses. To respond to food safety emergencies, Member States require a multiagency, multidisciplinary national food safety emergency plan with appropriate links between food control authorities, public health authorities and as necessary with other responsible agencies. Similar structures are required to manage responses to food safety incidents, natural disasters and other public health crises that can have negative impacts on food safety. Such plans should include links to the International Food Safety Authorities Network (INFOSAN) – which aims to prevent and manage food safety events of potential international significance – and the International Health Regulations (IHR), as appropriate. Simulation exercises should be carried out regularly to test and update, as appropriate, emergency response plans. As part of such plans, national guidance or codes of practice should be developed for traceability of implicated food and feed for the timely identification and effective recall of affected products.

While recognizing the diversity of national food control systems at different levels of development and the wide range of food safety hazards, FAO and WHO have published a framework for developing national food safety emergency response plans to assist Member States in developing country-specific plans (34).





## Identifying and responding to food safety challenges resulting global changes and food systems transformation

### STRATEGIC PRIORITY 2

#### Aim

National governments are able to identify and proactively respond to global changes and transformations to food systems, as well as to the movement of foods that have the potential to impact food safety.

#### Why awareness and response to global changes and food systems transformation?

Food systems shape people's dietary patterns and nutritional status. They are complex and multidimensional webs of activities, resources and actors involving the production, processing, handling, preparation, storage, distribution, marketing, access, purchase, consumption, and loss and waste of food, as well as the outputs of these activities, including social, economic and environmental outcomes. Food systems are constantly being shaped by different forces, drivers and structural changes and decisions by many different stakeholders that could affect their sustainability. Sustainable food systems have a fundamental role to play in promoting healthy diets, improving nutrition and enabling other public objectives of food systems. Sustainable food systems are food systems that enable food safety, food security and nutrition for current and future generations in accordance with the three dimensions (economic, social and environmental) of sustainable development. Sustainable food systems must be inclusive, equitable and resilient (35).

The success of current food systems is measured primarily on whether they are delivering sufficient quantities of food to meet population needs. The food systems must be transformed to place health – of people, the environment, animals and plants – as a key priority. This requires a shift in the focus of current systems to also incorporate safety, affordability, biodiversity and quality of food, which benefits nutrition and health for all while reflecting the true costs on environment and livelihoods (6).

Today's global challenges – such as climate change and new and emerging microorganisms – are transforming the way we produce, market, consume and think about food (6). The provision of a long-term safe, nutritious, and affordable food supply is a global endeavour. The way we grow, produce and sell food impacts us all, either as stakeholders in national and global agri-food value chains or as consumers of the increasing variety of food that is produced domestically or imported. The complexity of global food systems and the speed at which they can change demands that governments and competent authorities have a clear view of the connectedness between the global and regional food systems within which food is produced, distributed and sold. Food safety is a core enabling factor



to successfully transform food systems and Member States need to be aware of food safety issues as the transformation of food systems accelerates. Responding to emerging risks in the food chain will require national coordination between all agencies with responsibilities for food safety, as well as international connectiveness and involvement of all food chain stakeholders.



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Governments must be ready for expected and unexpected changes in global food systems and movements of food and the potential impact these changes could have on food and feed safety. Monitoring of drivers of change that could contribute to the emergence of important hazards or issues is necessary at the global, regional and/or country-level. Additionally, enhancing food safety emergency response plans to incorporate preparedness mechanisms for cooperation and coordination across all relevant national competent authorities will assist in effectively managing a major food incident. Such plans should incorporate horizon scanning to identify emerging threats, risks and opportunities to enable proactive actions to protect consumer health. Risk-based food inspection, as opposed to traditional food inspection, provides opportunities to build systems to prevent food safety incidents by identifying risk factors and assessing the effectiveness of control measures in place. This vigilance will support proactive response to threats and opportunities. We live in unprecedented times in relation to global influences on a safe, affordable, secure and sustainable food supply. Failure to respond to new information will also magnify existing threats at the national level, such as public health risks from AMR transferred through food moving between countries.

Global awareness and engagement of competent authorities on changes to food systems beyond national boundaries is clearly subject to policy direction and availability of resources. Another challenge lies in the differing strengths of national food safety systems in countries at different stages of economic development and their ability to respond to threats and opportunities. Further, some geographical regions have relatively limited information available on how trends in food systems are impacting food safety and human illness. Given such disparities, international organizations such as WHO, FAO and its joint programme Codex Alimentarius have an important role in facilitating knowledge transfer and offering guidance on appropriate national and international food safety responses to global changes in food systems.

### **Strategic objective 2.1: Identify and evaluate food safety impacts arising from global changes and food systems transformations and movement of food**

Competent authorities with responsibilities for food safety should allocate specific policy and technical resources to identifying global changes in food systems and evaluating the potential food safety impacts, for example the growing trend in e-commerce and the use of online/internet platforms for food trade. The primary goal will be to ensure that changes in food systems and food flows are not generating new and unacceptable risks to human health. Evaluation of potential food safety issues associated with global changes in food systems usually reverts to standard practice in food safety. Food supply chains should be monitored as appropriate to determine exposure to new and existing hazards, and food safety science and risk assessment should be used to determine the likelihood and impact of foodborne illness occurring. Competent authorities may need to use a cross-disciplinary One Health approach when evaluating new hazards arising at the human-animal-environmental interface. Liaising with international organizations such as WHO, WOA and FAO can assist with identifying



@WHO/Tystraart

sources of information on likely risks to consumers. Competent authorities should also consider and enhance participation in the Codex Alimentarius and in national, regional and international networks such as INFOSAN, the Association of Southeast Asian Nations (ASEAN) Food Safety Network, and Food Safety Risk Analysis Network – South America (FSRisk) (36) and engaging with all stakeholders to foresee new trends.

Active sourcing of information on impending changes in global food systems and evaluation of changes in food safety risk profiles will provide early opportunities to implement food safety measures that are based on evidence and risk analysis principles rather than measures that are reactive and prescriptive. Systematically identifying and evaluating new and emerging risks provides the opportunity to rank those of most importance in the national circumstance and respond accordingly. Developing guidance and scale-up plans to improve the safety of food traded in traditional food markets is a priority. It will also be important to include and evaluate the impact of new technologies and novel production methods on the safety of the food and feed chain.

**Strategic objective 2.2: Adapt risk management options to emerging foodborne risks brought about by transformation and changes in global food systems and movement of food**

National competent authorities should proactively respond to evidence of new food safety risks arising from global changes in food systems as well as evidence of shifts in current levels of consumer protection for known hazards and adapt this evidence in risk management and regulations. Without a broad and dynamic understanding of the scale and impact of potential food safety risks, governments will make ill-informed risk management decisions.

New scientific advances inform the development of risk management guidance in response to emerging foodborne risks through such organizations as Codex Alimentarius and its subsidiary bodies. Competent authorities should monitor and take up early development of international guidance and refine the regulatory response at country level as more information on the extent of the change in food systems and risk assessment data accumulates. A One Health approach should be the guiding principle to tackle emerging food safety risks that arise from the human-animal-environment interface. One of the examples of this approach is the containment of foodborne AMR. Evidence of food fraud on a global scale may cause substantial shifts in trade flows of food and stimulate food safety authorities to generally strengthen national food safety systems in terms of traceability of foods.





## Improving the use of food chain information, scientific evidence and risk assessment in making risk management decisions

### STRATEGIC PRIORITY 3

#### Aim

Food safety stakeholders are able to make risk management decisions and allocate resources to strengthen national food safety systems utilizing food chain information, scientific evidence, technical and economic information, and risk assessment.

#### Why take an evidence- and risk-based approach to utilization of information gathered from throughout the food chain?

The modern regulatory approach is to intervene at the point in the food chain where the most practical or most effective mitigation of risk can be achieved. Therefore, sourcing information on hazards throughout the food and feed chain is essential to achieve integrated development and implementation of management options based on risk and other evidence.

Generating the evidence base for development of control measures depends on scientific knowledge on the presence and level of hazards and the technical feasibility and cost-effectiveness of control alternatives at different steps in the food chain. Given that microbiological hazards can remain static, multiply or diminish at different steps, and risk to consumers depends largely on the level of exposure remaining at the point of consumption, evidence on fluctuations of foodborne pathogen concentration throughout the food chain greatly assists design of control measures. In the case of chemical hazards, levels generally remain constant once introduced to the food and evidence on potential entry points and methods to limit contamination throughout the food chain is the primary risk management goal. As well as informing development of specific control measures, scientific evidence on hazards and their control from throughout the food and feed chains is essential to design risk-based system elements. Examples include a risk-based inspection programme for imported foods and domestically produced foods, categorization of the risk category of food businesses when deploying verification resources, and sampling plans for monitoring and review of food safety outcomes and regulatory performance.

A strategic approach to increasing the use of whole-of-food-chain information, foodborne disease databases, food consumption data, scientific evidence and risk assessment to strengthen national food safety systems can be actioned through the following objectives.



### **Strategic objective 3.1: Promote the generation and use of scientific evidence and risk assessment when establishing and reviewing food control measures**

Risk analysis consists of risk assessment, risk management and risk communication. The application of this discipline is now well embedded in the food safety legislation of most countries. The principles for application are well described by Codex Alimentarius (37). However, many Member States need to invest in capacity-building for risk assessment, promote evidence-based health policy-making and strengthen participation in national and regional networks for risk assessment. There is also a need for investment in surveillance and monitoring programmes for chemical and biological contaminants in the food chain and developing food consumption databases to generate data for underpinning evidence-based decision-making.



Applying a risk management framework to establish and monitor food control measures consists of the following well-established steps:

- i. describing and scoping the food safety issue;
- ii. gathering scientific evidence and carrying out an assessment of any risks to consumers;
- iii. identifying and selecting risk management options, while taking into account the economic consequences and the technical feasibility of risk management options;
- iv. implementing the control measure; and
- v. monitoring the food chain and reviewing the measure if it is not achieving the expected outcome.

Applying an evidence- and risk-based approach to setting and reviewing control measures at the national level is an important obligation under the provisions of the WTO SPS Agreement.

### **Strategic objective 3.2: Gather comprehensive information along and beyond food chain and utilize these data when making informed risk management decisions**

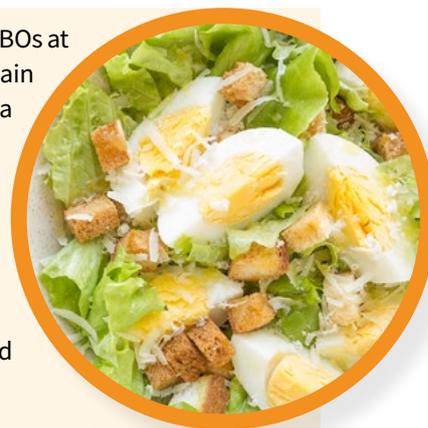
There are many sources for gathering information on hazards throughout the food chain. Depending on the circumstance, the prevalence and/or concentration of hazards in or on the food, legal authority, technical feasibility and economic consequences will be the primary inputs to a risk management decision on the control measures required at specific steps in the food chain. For imported foods, exporting country risk profiles, importer declarations and the results of border and post-border inspection and monitoring should be combined as information sources to continuously evolve towards evidence-based imported food safety systems. For foods produced domestically, information sources start at the production level and are strengthened by supplier declarations, traceability arrangements and monitoring during primary and secondary processing. Information along the food chain should not only focus on hazards, but also should include industry practices, consumption data and foodborne disease information. Advanced digital technology can improve food traceability systems leading to rapid recall or withdrawals of unsafe foods from the market.



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For instance, food safety management systems implemented by FBOs at primary and secondary processing are a prime source of food chain information, resulting from monitoring of process control criteria and regulatory food safety criteria. Additionally, at the retail end of the food chain, competent authorities may implement routine and targeted sampling of foods for chemical and microbiological hazards. Industry product recall systems used to manage both voluntary and regulatory recalls, along with submission to the competent authority of the risk-based actions taken by the food supplier, are also useful sources of information for evidence- and risk-based strengthening of national food safety systems.



The draft principles and guidelines for the assessment and use of voluntary third-party assurance (v-TPA) were discussed at the Codex Alimentarius Commission in November 2021 (38). Information/data generated by v-TPA programme may be used by competent authorities to support their regulatory controls once the integrity, reliability and credibility of their governance structures have been established.

### **Strategic objective 3.3: Source food safety information and risk analysis experiences from beyond national borders to strengthen risk management decisions and technical capacity**

Risk management at the national level increasingly relies on global availability of data on sources and levels of hazards in foods; a consequence of the increasing volume and complexity of food in trade and the substantial inputs needed to carry out risk assessment. International organizations such as FAO, WHO, Codex Alimentarius and WOAAH offer a wealth of food safety and standard-setting information to competent authorities establishing and reviewing national food safety systems, alongside a substantial library of risk assessments carried out by the FAO and WHO expert bodies, such as the Joint FAO/WHO Expert Committee on Food Additives (JECFA), Joint FAO/WHO Meeting on Pesticide Residues (JMPR), and the Joint FAO/WHO Expert Meetings on Microbiological Risk Assessment (JEMRA).

Many countries have limited resources to monitor the food and feed chain for hazards and to survey the human population for FBDs and should draw on international bodies to supplement national information sources and inform standard setting. WHO developed the Global Environmental Monitoring and Assessment Programme (GEMS/Food) which provides governments and other stakeholders with information on global trends in chemical contamination of food and their contribution to total human dietary exposure. Membership of the INFOSAN involves exchange of information on food safety incidents and provides access to global intelligence to inform emergency responses at the national level. The Global Foodborne Infections Network (GFN) strengthens national and regional surveillance and investigation of foodborne illness and AMR, and fosters connections between food safety, animal health and public health stakeholders, as well as building capacity to help with risk management. The Global Early Warning System (GLEWS) was jointly established by WHO, FAO and WOAAH; it provides early warning of threats to human and animal health and carries out rapid risk assessments at the One Health human-animal-environment interface.



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### **Strategic objective 3.4: Consistent and transparent risk management decisions when establishing food control measures**

Ensuring transparency and consistency in risk management decisions at the national level are important attributes that increase trust and confidence in the regulatory system. While minimizing foodborne risks to the consumer is the primary driver of risk management decisions, other considerations come into play when deciding on the best option for regulation in the national context. In addition to the specific adverse health effects being evaluated, these include feasibility, cost and practicality of the proposed control measure, proportionality of the level of risk reduction to be achieved, availability of sampling and laboratory analytical tools for monitoring, and socioeconomic impacts. The final decision that balances these inputs against the primary goal of minimizing foodborne risks should be clearly documented as to the weighting given to each input.

In many countries, different government ministries have a keen interest in decisions on food control measures made by the competent authority and their inputs may need to be considered as part of the decision-making process. Competent authorities can benefit from the use of international guidelines on multifactor decision-making to promote consistency and transparency in their choice of control measures (39). A One Health approach to risk management generally involves cross-disciplinary inputs when responding to existing or emerging risks arising at the human-animal-environmental interface. As health threats become more complex, mitigation cannot be achieved by one sector acting alone. Food safety authorities may have to factor in public health, veterinary health and environmental health considerations in establishing control measures. For example, there is a critical need to reduce the unnecessary use of all classes of medically important antimicrobials in food-producing animals without compromising animal welfare, and the use of these antimicrobials as growth promoters should be restricted.



@FabrikaPhoto



## Strengthening stakeholder engagement and risk communication

### STRATEGIC PRIORITY 4

#### Aim

Food safety stakeholders foster a food safety culture and encourage the acceptance of their individual and collective responsibility for food safety.

#### Why strengthen stakeholder engagement and risk communication?

Strengthening stakeholder engagement and communication on food safety is an essential part of the national food safety system. Stakeholder engagement – specifically, risk communication – complements and supports regulatory activities, promotes consultation with the agri-food sector and empowers consumers. This can build expectations of higher levels of food hygiene and foster an evolution towards a food safety culture.

Food safety is a shared responsibility. Stakeholders, including regulators, FBOs, academia, research institutions and consumers all have a role in ensuring safe food for all. Regulatory frameworks on food safety are necessary to define what is acceptable, establish measures to monitor compliance and address non-compliance, thus protecting the public from unsafe or fraudulent practices. Minimizing food safety risk requires that FBOs consistently play their part in producing safe food and minimizing foodborne risks. Regular interaction and consultation between industry and regulators leads to improved acceptance of, and compliance with, food standards. Schemes for incentivizing food industry compliance are also an option that could be considered by regulatory authorities.

Empowering consumers through effective risk communication and education to make safe and healthy food choices further stimulates industry to meet that demand by producing safe, nutritious and appropriately labelled food. Educated and informed consumers can play an important role in driving good hygienic practices and environmental sanitation in food processing and retail, as well as in traditional food market settings and street foods.

In strengthening national food safety systems, risk communication and stakeholder engagement are priority areas for action. When developing risk communication programmes, it is essential for competent authorities to listen to concerns of all stakeholders, to be cognisant that communication is a two-way process, to accept and fully involve stakeholders, to be open and transparent, and to evaluate and consult on activities. To develop a programme of strong engagement and shared responsibility, it is proposed that Member States focus activities on the following five Strategic Objectives.



### **Strategic objective 4.1: Establish platforms for consultation on the national food safety agenda**

Sharing responsibility at the national level comes in several forms. Engaging with all stakeholders is key to raising levels of food safety to prevent and reduce foodborne illness and encourage compliance with regulatory requirements. For the smooth functioning of national food safety systems, both formal and informal consultation with those likely to be impacted by changes and developments is essential. Including a provision in national legislation for competent authorities to establish platforms for constructive dialogue with different sectors of society will strengthen stakeholder engagement. Such a platform will allow for a formal two-way dialogue that enables the food sector and civil society to bring views and concerns to the attention of competent authorities and allows competent authorities to provide updates on new initiatives and food safety issues. Though it is important to consider different views from all relevant stakeholders, any food safety decisions should be based on available scientific evidence. There should also be mechanisms in place to safeguard the decision-making from potential conflicts of interest that could put corporate interests over public health.



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### **Strategic objective 4.2: Assess the pertinence of using non-regulatory schemes for enhancing food safety across the food chain**

It is now internationally accepted that FBOs have the primary responsibility for producing and marketing safe foods (40). Competent authorities in Member States may wish to consider the adoption of incentive schemes<sup>3</sup> to reward FBOs that fully comply with regulatory requirements. Where non-compliance is identified and additional inspections or laboratory analysis are required, this should be reflected in additional costs for the food business operator.



@Omotayotajudeen

Private food safety standards are sometimes used by well-established industries to support their food safety management systems and establish specifications for their suppliers. These standards are generally not used in countries where small-scale producers and informal markets dominate. Private standards-setting coalitions and industry associations have created and adopted standards for food safety and food integrity that focus on establishing controls and conformance in the production, transport and processing of food that are additional to regulatory requirements and Codex standards. These are increasingly monitored and enforced through third-party certification. Accreditation to these standards is becoming an entry level requirement for some business-to-business transactions. However, private food safety standards may not always be based on science or comply with national legislation. In addition, they may overlap with national regulatory food control systems that already incorporate agreed levels of consumer protection. Furthermore, they may present challenges for less developed countries that are already meeting Codex international standards and may create an uneven playing field for different suppliers in common food systems. While recognizing the right of food businesses to establish specifications for inputs to their operations that go above and beyond official food control requirements, it is important that private food safety standards do not stand in the way of – or marginalize – food safety regulations by national authorities in exporting countries.

<sup>3</sup> Such as reducing the frequency of inspection for fully compliant FBOs and reducing the overall cost of compliance.

### **Strategic objective 4.3: Establish frameworks for sharing verification of compliance with food safety regulatory requirements**

In some jurisdictions, governments are progressively delegating selected food control functions to private entities, following the realisation that such entities could work effectively alongside the regulator in delivering food safety services. While delegating food control functions to third parties provides flexibility to all parties, the competent authorities need to maintain a strong oversight of compliance with regulatory requirements, carry out enforcement and retain final accountability for verification of food safety measures in food business operations. The competence of third parties should be assessed against objective criteria before delegation. Competent authorities or governments must persist in their key responsibility of verifying that FBOs comply with food regulations.

### **Strategic objective 4.4: Facilitate communication, capacity-building and engagement with food business operators and foster a food safety culture**

Stakeholder engagement on food safety is a vital function of the competent authority and essential for building trust in the national regulatory programme. It complements and supports regulatory activities, empowers consumers and builds the expectation of a culture of safe food. Increasing food safety awareness and knowledge among all stakeholders in the national food safety system can have a significant impact

on the prevention of FBDs. National food safety systems should include training and education components designed to ensure that all food handlers, particularly SMEs in LMICs, receive the training required to adequately perform their work assignments; to maintain their professional competence; and to ensure consistent application of regulatory requirements. FBOs should be encouraged to establish, commit to, and maintain a food safety culture. In countries with traditional food markets and informal street food settings, special programmes need to be developed to communicate and engage with market traders and food stall holders on the importance of hygiene and sanitation in food processing and preparation. Such programmes should align with WHO's guide to healthy food markets ([41](#)).

Guidance, training and awareness programmes targeted at all relevant FBOs should be put in place. These will facilitate the acceptance of the primary role of the food sector to produce safe food, build compliance with regulation and reinforce belief by control staff in the importance of their work. Communication systems and channels should be put in place to inform trading partner countries in all cases of an incident where unsafe or suspected unsafe food has been placed on the market.

### **Strategic objective 4.5: Facilitate communication, education and engagement with consumers**

Sharing responsibility comes in several forms. A simple but potentially very effective tool for improving food safety outcomes is to provide targeted and accurate information and health messages on food safety and healthy diets to consumers on how to minimize the risks associated with food handled, prepared and consumed in the household and how to make better food choices. Competent authorities should enhance its capacity on consumer education and behaviours and develop country-specific strategy to ensure consumer food safety education is a priority. A key challenge is how to channel relevant and factual information to consumers given the proliferation of social media



@ssp48



@BirdLPPortfolio2559

platforms and the dissemination of false and potentially harmful information, particularly when managing serious food safety incidents. Inaccurate information can spread widely and rapidly, causing anxiety and fear among consumers. Food safety messaging can be integrated with other educational programmes, such as school curricula or awareness activities on nutrition, maternal health or noncommunicable diseases. This would require the joint effort and communication with other health programmes and other ministries at Member State level. The design of such educational messaging should also take into consideration consumers' perception of food safety risks. There is also recognition that women play a key role in food production and preparation and are an efficient target for food safety education to improve health. Women should be empowered with essential knowledge in food safety and hygiene practices. Additionally, for women working in food systems, the equipment, tools and accessories should be tailored to the needs of women as needed.

New digital technologies can also facilitate consumer protection through improved tracking and tracing of problematic foods and ingredients. In the event of unsafe food reaching the consumer, specific information on food recalls can be rapidly disseminated to consumers via both conventional and social media channels. This is of particular importance when foods containing pathogenic microorganisms or allergens without specifying in food labels need to be rapidly removed from the market.





## Promoting food safety as an essential component in domestic, regional and international food trade

### STRATEGIC PRIORITY 5

#### Aim

National governments are able to recognize food safety as an essential component to the economic success of national food production in domestic, regional and international trade.

#### How does safe food enhance livelihoods and boost economic development?

In addition to contributing to enhancing livelihoods and food security, food safety has a critically important influence on the economic success of national food systems. The consequences of unsafe food can be measured in suffering, disability and loss of life, or foregone income and wages; these personal and social costs are unnecessarily high. Estimates from WHO show that FBDs made 600 million people sick and caused 420 000 premature deaths in 2010. While the burden of FBDs is a public health concern globally, the WHO African and South-East Asia Regions have the highest incidence and highest death rates. The INFOSAN activity report (42), showed that there were 162 food safety events impacting all continents from 2018 to 2019, nearly double the number of events reported in any previous two-year period. These cross-border food safety events doubtlessly have negative impacts on consumers' health and domestic and international markets. In its 2019 report (19) the World Bank Group estimated that the economic costs of unsafe food, measured in terms of illness, disability, and premature deaths induced by unsafe food led to productivity losses of about US\$ 95 billion a year in LMICs. In addition, the annual cost of treating foodborne illnesses was estimated to be US\$ 15 billion. The report concluded that unsafe food undermines food and nutritional security, human development, the broader food and agriculture economy, and international trade. The impact on individual businesses of food safety failures can be significant through the immediate losses in productivity and food wastage, erosion of consumer and investor confidence, and interruptions in trade with food recalls and border rejections. When governmental policies neglect food safety, high social, health, economic and environmental costs result, which impedes the achievement of the SDGs. The relevance of food safety to society, economic development and sustainable food systems is key to investing in national food safety systems.



The Codex Alimentarius Commission has a specific mandate to develop science-based international food standards that will protect consumer health and ensure fair practices in the food trade and promote international harmonization of food standards. These goals are mutually reinforcing. To protect consumers' health and increase access to safe food in both domestic and international markets, it is essential for Member States to strategically invest and actively engage in the work of the Codex Alimentarius, Standards and Trade Development Facility (STDF) and other international organizations. The following four strategic objectives are proposed to facilitate this process.



@Li.Zhongfei

### **Strategic objective 5.1: Strengthen food control systems and capacity development in regulatory systems for the domestic market**

The strengthening of national food control systems for exports to meet standards of international markets must be carried out while maintaining vigilant oversight of domestic markets, including imported foods and traditional food markets. Trade-dependent compliance with food safety standards has been the catalyst for the significant upgrading of food safety management capacity in many LMICs. However, investment in trade-related capacity development and enhancement of the export food trade does not always lead to better domestic food safety systems or improve public health for the national population. Unfortunately, it may also have a negative impact if unsafe products rejected in export markets find their way back into domestic markets.

The use of international food standards for domestic food production establishes a visible and acceptable level of consumer protection and promotes a fair trading environment whereby countries can gain economic advantage from cost-effective and efficient national food production systems. Member States should promote the uptake of Codex standards within domestic legislation, setting public health goals that the food industry can use as a benchmark when bringing innovation and economic change to sustainable national food systems. Member States should also consult the guidance from Codex standards to improve food safety by implementing measures to improve food hygiene and food handling, mitigate against contamination and implement proper food labelling, for example. Greater harmonization of food safety standards can increase domestic food safety and provide greater assurance of the safety of imported foods.

### **Strategic objective 5.2: Strengthen interaction between national agencies responsible for domestic food safety and those facilitating international fair trading practices**

Within most countries, responsibilities for food control and/or economic aspects of the food and agriculture sector are spread across several ministries, institutions or departments. National governments therefore face a significant challenge in coordinating the functions of different agencies across food systems and arriving at management decisions that accommodate different mandates and goals. Competent authorities responsible for food safety need to liaise with all agencies of government that have responsibilities for trade facilitation and promotion at the international level. This includes ministries or departments of trade or enterprise, national embassies and trade missions, national customs and excise agencies, and food marketing and promotion bodies. A high level of engagement and sharing of information is essential to achieve consistent access to international markets, particularly during crises or emergencies of food safety or security.



@Seventyfourimages

Entry of new high value foods into the market or foods sold in large quantities can create a strong incentive for adulteration for commercial gain, especially in internationally traded foods. As food systems grow with high value supply chains, it is increasingly important that responsible agencies across government cooperate in protecting the domestic and export trade from disruptions that may result in the loss of markets over the short or medium term. This is best achieved by establishing a formal structure for the collection and analysis of intelligence and information from a range of sources to enable the preparation of detailed strategic assessments to identify food fraud threats, risks and vulnerabilities.



@Netfalls

**Strategic objective 5.3: Ensure that national food safety systems are aligned with the standards of the Codex Alimentarius to protect public health and facilitate trade**

While the primary function of food safety systems is to protect the health of consumers and reduce exposure to unsafe foods, food safety systems also have a role in facilitating fair trading practices that contribute to national economic development. The Codex Alimentarius Commission develops harmonized international food standards, guidelines and codes of practice to protect the health of consumers and ensure fair trade practices in the food trade.

Export assurances and negotiation of trade arrangements are functions of the competent authority that have a significant impact on agribusiness value chain development. Strengthening domestic and export components of national food safety systems will engender trust and confidence in exported foods, facilitate access to new markets and provide economic advantage to the food industry. In return, this can stimulate stakeholders such as governments and FBOs to invest more resources to ensure food safety.

Principles and guidelines for a well-functioning national food safety system for imported and exported foods are well established by Codex. They include requirements for systems to be designed and operated based on risk assessment, to be non-discriminatory and – where export certification is carried out – to assure the validity of the certification by the competent authority. These can be used as the basis for the development of food safety equivalency agreements between Member States, which, in turn, will minimize unnecessary duplication of controls while providing an effective means for protecting the health of consumers.

**Strategic objective 5.4: Strengthen engagements of national competent authorities with international agencies and networks that establish standards and guidelines for food**

Food safety standards and trade go together in ensuring safe, nutritious and sufficient food for a growing world population. Governments should use internationally agreed standards, guidelines, and recommendations to the greatest extent practical; this is congruent with the WTO SPS Agreements that obligates governments to base their sanitary and phytosanitary measures on the standards, guidelines and recommendations of the Codex Alimentarius, the WOH and the International Plant Protection Convention (IPPC) where they exist, unless a higher level of sanitary or phytosanitary protection is justified.



@Pexels

Member States should participate to the extent feasible in the activities of Codex Alimentarius Committees and working groups, and the WOH, when relevant. They should also build awareness of these activities within national competent authorities with the involvement of the food sector. An inclusive, transparent and effective consultation mechanism should be put in place at national level on Codex related matters to build informed and strategic country positions. Designation of a Codex Contact Point supported by a National Codex Committee (NCC) is the recommended way for countries to become actively involved in the work of Codex. The composition of the NCC should include representation from all relevant stakeholders, including ministries, nongovernmental organizations, consumers and industry, providing an opportunity to present their views on Codex matters.

Recognizing that risks to human health and food safety may arise at the farm and any subsequent stage in the food production continuum, the WOH and Codex collaborate closely in the development of their respective standards relevant to the whole food production continuum. National level coordination between WOH delegates and NCC is also critical to ensure that risk management addresses risks at the appropriate stages in the whole food production continuum.









# IMPLEMENTATION OF THE STRATEGY BY MEMBER STATES AND THE ROLE OF WHO

## How can Member States implement the strategy?

**M**ember States should modify, redesign or strengthen their national food safety systems as appropriate based upon the strategic priority areas and strategic objectives identified in this strategy. As food safety systems in Member States are in various stages of development, the prioritization of strategic actions should be tailored to each country's unique situation.

Some Member States may wish to take a gradual or stepwise approach to guide strategic actions to strengthen their food safety systems. This approach consists of interacting and interdependent components that form a comprehensive and well-coordinated entity as opposed to an approach that seeks to strengthen individual components of the system with limited consideration to the uniformity and interdependency of components of the system. A stepwise approach will allow countries to identify priority strategic actions that can help strengthen the uniformity of food safety systems at their respective stages of development. The focus should initially be on strengthening the minimum legal and operational requirements for food safety risk management and responding to food safety incidents and emergencies. This will facilitate the establishment of a sound foundation on which to build an effective system, in addition to helping countries to prioritize interventions and maximize returns on investments in food safety systems.

The general approach for Member States to develop, update and implement their national food safety strategies comprises four steps illustrated in Fig. 8 with examples of tools that can be used to facilitate each step:

1. **Conduct a situation analysis;**
2. **Develop a national strategy and action plan on food safety;**
3. **Implement the national strategy and action plan; and**
4. **Conduct regular review of the implementation and adjust the plan and strategy, as appropriate.**

**Fig. 8. General guidance for Member States for the development and implementation of the strategy**





For the situation analysis, FAO and WHO developed an assessment tool to assist Member States in evaluating the effectiveness of their food control systems, whatever the level of its maturity (43). This tool can be used to evaluate the status of the national food control system, to identify strengths and weaknesses, and to identify priority areas for action. When evaluating national food safety systems, each of the core components should be assessed and benchmarked against the strategic priorities outlined in this Global Strategy for Food Safety. Besides this FAO/WHO tool, the Joint External Evaluation (44) and Electronic State Parties Self-Assessment Annual Reporting Tool (45) under the WHO International Health Regulation can also be utilized to assess the national food safety preparedness capacity. Additionally, the WOAHP Performance of Veterinary Services (PVS) Pathway (46) specifically targets the safety assessment of production and processing of food of animal origins. Once a baseline assessment of the national food safety system has been carried out, it will be possible to define objectives and target interventions to strengthen the system based on the five strategic priorities areas identified in this strategy.

The situation analysis should be followed by the development of an implementation plan that includes the sequence for different elements of the restructured food safety system to be applied, definition of roles and responsibilities, and the establishment of a monitoring and evaluation system. The plan needs to be properly financed to accomplish its objectives. This will require engagement and analysis by a variety of experts, disciplines and all relevant stakeholders. Once the plan is agreed and communicated, the implementation phase can begin. Regular progress checks and reports should form a part of the regular monitoring to ensure the plan remains on course or that appropriate course correction measures are applied.

## The role of WHO

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WHO is committed to reducing the health, economic and social burden derived from FBDs by advising and assisting Member States to reduce exposure to – and increase monitoring of – unacceptable levels of chemical, microbiological and physical hazards.

Specifically, WHO's role in the strategy can be reflected in the following areas.

### **1 Accelerate global action to improve equitable improvement in food safety and mainstream food safety in the health and development agenda**

WHO, together with other agencies, will advocate for stronger investment in food safety by developing a global investment case and providing technical advice to countries that want to improve their food safety systems, particularly those who have the highest burden of FBDs or the weaker food control systems.

WHO will also advocate, provide the analytics and establish global monitoring systems for the establishment of a food safety indicator for food safety so as to quantify the contribution of this area to the achievement of the SDGs.

Furthermore, WHO will organize and utilize different global forums and campaigns in food safety, nutrition, food systems and public health to encourage policy dialogues with Member States, UN organizations, academia, private sectors, civil societies, and other non-State actors to mainstream food safety in their action plans and policies. Particularly, WHO will build on the outcomes of the UN Food Systems Summit to ensure that food safety is a part of the countries' transformation pathways.

### **2 Synthesize evidence and generate normative guidance**

WHO, together with FAO, will synthesize evidence by catalysing and coordinating the scientific advice and research related to food safety and nutrition; continuing and further enhancing its role in the Codex Alimentarius to ensure secure, sustainable and predictable funding for the Codex scientific advice; and regularly update the global burden estimates for the FBDs and zoonoses. The evidence synthesized will be further translated into international standards and normative guidance on food safety to inform policy-making. In the meantime, based on the initiatives on the WHO organizational impact measurement framework, WHO will monitor the evolution and changes of food safety risks over time and evaluate the solutions implemented, in terms of implementation rates, cost-effectiveness, health impacts, risk reduction, etc.

### **3 Enhance technical cooperation and build stronger capacity**

WHO will provide and regularly update diagnostic tools and practical guidance to assist countries in implementing the strategy. The supports will be tailored to countries' needs and may vary between upstream actions (such as the development of national action plans on food safety) to downstream actions (such as the assessment of national food control systems, the data generation on research and surveillance related to FBDs, and estimation of national foodborne disease burden). WHO will also actively disseminate food safety information, provide technical training and workshops for targeted audiences, including consumers and youth, and support and produce guidance for FBOs and competent authorities under both normal and emergency situations.



#### **4 Build partnership and foster global collaboration**

Strategically, WHO will strive to harmonize the efforts and shape the future agenda for food safety together with key partners, such as FAO, WOAHA, and UNEP, by applying a One Health approach to improve national and global food safety. Technically, WHO will actively engage with a network of collaborating centres for support on various aspects in food safety. Moreover, WHO will further establish and strengthen the existing relationship with all stakeholders, including international organizations both within and beyond UN systems through multiple food safety initiatives (e.g., INFOSAN, Codex Trust Fund, and STDF), NGOs, as well as the private sector, to support their engagement on driving positive policies and behaviour changes in food safety. Additionally, WHO will provide multilateral fora for dialogue, enabling Member States to share knowledge and experiences related to food safety risk assessment, risk management, risk communication and capacity-building.

The above mentioned four dimensions are closely interconnected. Thus, WHO will also focus on strengthening its own capacity and capability in all four areas to support Member States in implementing the strategy.

## Enhance international cooperation

Besides conducting activities at the national level to implement the WHO Global Strategy for Food Safety, national governments need to engage with the global food safety community to the maximum extent practical to inform and assist in strengthening food safety systems.

International organizations such as WHO and FAO need to further facilitate and coordinate international cooperation on food safety by continuing to provide secretariat functions to multiple food safety networks, initiatives and programmes; support countries to build stronger food safety capacity; and produce and disseminate normative guidance.

Effective national food safety systems are key to safeguarding the health and well-being of people, as well as to fostering economic development and improving livelihoods by promoting access to domestic, regional and international markets. The COVID-19 pandemic that rapidly spread throughout the world in 2020, is a compelling reminder of the links between people and the interconnectivity of nations. Efforts to suppress the virus and protect public health relied on leadership, science, evidence, guidance, collaboration and cooperation across the globe. The same factors would apply to an emergence of a new foodborne pathogen and AMR trait in a world in which food and food ingredients – as well as the associated hazards and risks – traverse the globe. Greater international and regional cooperation are required to prevent unsafe food from causing ill health and hampering progress towards sustainable development.

There are two dimensions for international cooperation:

- 1. technical cooperation among countries, and**
- 2. participation in food safety programmes initiatives, and networks coordinated by international organizations.**

Technical cooperation among countries includes the need for the collection and exchange of data on food control and food contamination with trading partners; the recognition of equivalence of national food control systems where these achieve the same level of public health protection; the joint risk assessment and food safety research programmes among countries; study tours, staff secondment, and sharing documentation such as Code of Practice (CoP) and experiences.

Examples of the participation of regional and international networks and WHO programmes, include:

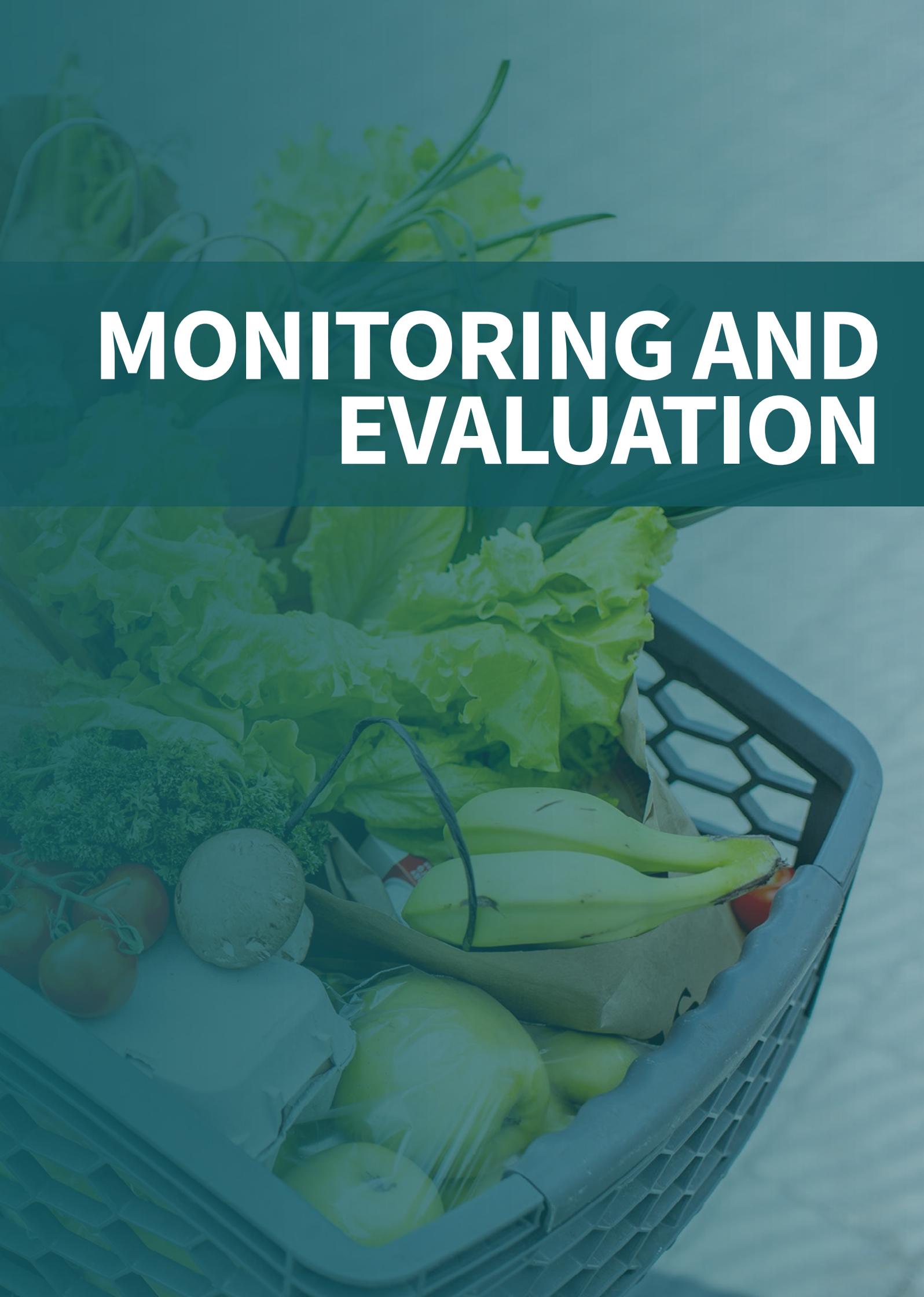
- WHO programme on surveillance and response to FBDs and AMR. Countries can strengthen their foodborne disease and AMR and response activities, integrating them into existing national surveillance and response systems as required by the IHR.
- WHO GEMS/Food gathers data on levels and trends of contaminants in food, their contribution to total human exposure, and significance with regard to public health and trade.
- FAO/WHO Global Individual Food consumption data Tool (GIFT) is a publicly available multipurpose global database obtained through the collation and harmonization of existing data collected within individual food consumption surveys conducted at national or subnational level. This tool contributes to increasing the capacity of all stakeholders to monitor food consumption.

- INFOSAN provides a secure communication platform for country members to interact and learn from other countries, leading to improved international cooperation. During food safety events of international concern, critical information such as the international distribution of contaminated foods, possible public health consequences and risk management options is shared from one country to many through INFOSAN processes.
- Codex Alimentarius, which supports Codex Contact Points and NCCs and participates to the extent practical in international expert groups and the development of international standards, guidelines and recommendations so as to represent national views and gain experience in risk analysis.

The FAO Committee on Agriculture (COAG) also requested coordination with WHO to update the FAO 2014 strategy for food safety. The new Food Safety Strategy, to be finalized by 2022, will outline how FAO aims to support its members to improve food safety. WHO and FAO strategies will reflect common principles and are expected to be mutually supportive. Both organizations intend to develop a joint implementation plan to keep supporting Member States in a coordinated manner.





A high-angle photograph of a grey plastic shopping basket filled with fresh produce. The basket contains several items: a head of green lettuce, a bunch of green tomatoes, a whole mushroom, a bunch of green bananas, and a bag of green onions. The background is a light-colored, textured surface. The entire image is overlaid with a semi-transparent teal filter.

# **MONITORING AND EVALUATION**

## Monitoring the performance at national level

Once a national food control system is in place, it is essential to verify that it is properly implemented, and that it operates effectively, has the capacity and capability to undergo continuous improvement, and can adapt to advances in science and technology. The keys to success are identifying expected outcomes, and setting, communicating and achieving appropriate objectives.

Monitoring and evaluation require analyses of the results being achieved and a comparison against the aims and objectives set out in the plan. The evaluation can help identify failures, inefficiencies or other issues which may result in less than satisfactory outcomes. It can also identify opportunities for improvement. This may result in changes or adjustments to the plan and its implementation.

Part of the management of any programme is to select indicators and set targets. These simplify performance management by allowing all participants to understand their roles and understand the roles others play. Indicators provide information about progress towards an objective and targets, and also support decision-making at all levels of an organization so that necessary actions can be taken. Indicators are important to the objectives of national food safety systems because they keep the objectives at the centre of decision-making. Once properly communicated, they ensure that overarching aims are at the forefront and the intention of the food safety system is clear.

National competent authorities should also put programmes in place to regularly assess the effectiveness and appropriateness of the national food safety system in achieving its objectives to protect the health of consumers and ensure fair practices in food trade. As part of the overall management of the food safety system, it is proposed that competent authorities should establish an appropriate national audit system for the independent auditing of the effective implementation of their official food controls. The Principles and Guidelines for Monitoring the Performance of National Food Control Systems developed by the Codex Alimentarius will assist with this task (47).



## Global progress and impact measurement

Progress of the global strategy for food safety will be measured through at least the three indicators presented in Table 1. The Annex 2 presents more detailed information, targets and the rationale for the selection of these indicators.

**Table 1. High-level indicators proposed for the WHO Global Strategy for Food Safety**

Indicator	Type	Source
Foodborne diarrhoeal disease incidence estimated per 100 000 population	Outcome indicator (impact)	WHO global estimates on foodborne disease burden informed by FERG <sup>4,5</sup>
Multisectoral collaboration mechanism for food safety events	Capacity indicator (progress)	International Health Regulations (2005): State Party Self-Assessment Annual Reporting Tool (45)
Surveillance of foodborne diseases and contamination		International Health Regulations (2005): Joint External Evaluation Tool (44)

In 2017, WHO established the Foodborne Disease Burden Epidemiology Reference Group (FERG). The FERG was reactivated in 2021 to provide WHO with technical advice on the global burden of FBDs with up-to-date estimates of global incidence of FBDs, mortality and disease burden in terms of disability-adjusted life years (DALYs).

The FERG is a group of experts that will advise WHO on the methodology to estimate the global burden of FBDs in 2025 and advise on the development of – and the methodology to monitor – food safety-related indicator(s). The outputs of their work are expected to inform the impact measurement of this strategy. FERG recommended that countries should start building/strengthening national foodborne disease surveillance systems to typify and report as an optional indicator on *Salmonella* Typhi (incidence per 100,000 population).

Other indicators related to the strategic objectives may be used for Member States to assess the implementation of the strategy. WHO will prepare a road map with key milestones, indicators, and tools to support Member States in this area.

<sup>4</sup> Foodborne Disease Burden Epidemiology Reference Group (FERG). Geneva: World Health Organization (WHO) ([https://www.who.int/groups/foodborne-disease-burden-epidemiology-reference-group-\(ferg\)](https://www.who.int/groups/foodborne-disease-burden-epidemiology-reference-group-(ferg))).

<sup>5</sup> Terms of Reference for the Foodborne Disease Burden Epidemiology Reference Group (FERG) 2021-2024. Geneva: World Health Organization (WHO); 2021 (<https://www.who.int/docs/default-source/food-safety/call-for-experts/tor-for-reference-ferg-31aug2020.pdf>).



A woman wearing a vibrant orange and yellow patterned sari is kneeling in a strawberry field. She is focused on tending to a young strawberry plant growing in a hole in the white plastic mulch. Her hands are adorned with several bangles and rings. The background shows rows of similar plants stretching into the distance under a bright sky.

# ANNEXES

# ANNEX 1: GLOSSARY

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## Competent authority

The official government organization or agency having jurisdiction (2). Throughout this document this usually means the competent authority responsible for food safety.

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## Control

Any form of control that the competent authority performs for the verification of compliance with feed and food law (and animal health rules) (48).

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## Control measure

Any action and activity that can be used to prevent or eliminate a food safety hazard or reduce it to an acceptable level (1).

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## Control plan

A description established by the competent authorities containing information on the structure and organization of the official control system, as well as its operation and the detailed planning of official controls to be performed, over a period of time (48).

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## Driver

A driver references the underlying cause of change. These may or may not be directly related to the issue at hand (49). Some examples of key drivers specific to food safety include globalisation, changing demographics, farming intensification, etc.

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## Event

The IHR (2005) defines an event as “a manifestation of disease or an occurrence that creates a potential for disease (which can include events that are infectious, zoonotic, food safety, chemical, radiological or nuclear in origin and whether transmitted by persons, vectors, animals, goods/food or through the environment) (20).

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## Event-Based Surveillance (EBS)

Is defined as the organized collection, monitoring, assessment and interpretation of mainly unstructured ad hoc information regarding health events or risks, which may represent an acute risk to human health. Event-Based Surveillance is a functional component of Early Warning and Response (EWAR) (20).

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## Food

Any substance, whether processed, semi-processed or raw, which is intended for human consumption. This includes drinks, chewing gum and any substance that has been used in the manufacture, preparation or treatment of food. It does not include cosmetics, tobacco or substances used only as drugs (50).

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## Food business operator (FBO)

The entity responsible for operating a business at any step in the food chain (1).

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## Food control

A mandatory regulatory activity of enforcement by national or local authorities to provide consumer protection and ensure all food is safe, wholesome and fit for human consumption during production, handling, storage, processing and distribution; that it conforms to food safety and quality requirements; and is labelled honestly and accurately as prescribed by the law (51).

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**Food safety**

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Assurance that food will not cause adverse health effects to the consumer when it is prepared and/or eaten according to its intended use (1).

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**Food control system**

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The integration of a mandatory regulatory approach with preventive and educational strategies that protect the whole food chain (48). Also referred to as the national food control system.

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**Food safety system**

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The food safety system is a component of the food system. It is the combination of all stakeholder activities in the food and feed chain that contributes to safeguarding the health and well-being of people, animals and the environment.

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**Food safety management system**

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A systematic risk-based approach to controlling food safety hazards within a food business utilizing HACCP principles to ensure that food is safe to eat.

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**Foodborne disease (FBD)**

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A disease commonly transmitted through ingested food. FBDs comprise a broad group of illnesses, and may be caused by microbial pathogens, parasites, chemical contaminants and biotoxins (5).

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**Food safety culture**

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Within a food business, food safety culture refers to shared values, beliefs and norms that affect mindset and behaviour toward food safety in, across and throughout an organization (52).

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**Food security**

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When all people, at all times have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life (53).

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**Food systems**

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Food systems shape people's dietary patterns and nutritional status. They are complex and multidimensional webs of activities, resources and actors involving the production, processing, handling, preparation, storage, distribution, marketing, access, purchase, consumption, and loss and waste of food, as well as the outputs of these activities, including social, economic and environmental outcomes. Food systems are constantly being shaped by different forces, drivers and structural changes and decisions by many different stakeholders that could affect their sustainability. Sustainable food systems have a fundamental role to play in promoting healthy diets and improving nutrition and enabling other public objectives of food systems. Sustainable food systems are food systems that enable food safety, food security and nutrition for current and future generations in accordance with the three dimensions (economic, social and environmental) of sustainable development. Sustainable food systems must be inclusive, equitable and resilient (35).

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**Food fraud**

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Any suspected intentional action committed when a food business operator intentionally decides to deceive customers about the quality and/or content of the food they are purchasing in order to gain an undue advantage, usually economic, for themselves (54).

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**Food defense**

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Is the effort to protect food from an intentional act on a food system, such as on product, processing plant or farm, which is intended to pose a public health threat, such as malicious tampering or terrorism (22).

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**Food waste**

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Is the decrease in the quantity or quality of food resulting from decisions and actions by retailers, food services and consumers (55).

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**Food loss**

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Is the decrease in the quantity or quality of food resulting from decisions and actions by food suppliers in the chain, excluding retail, food service providers and consumers (55).

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**Hazard**

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A biological, chemical or physical agent in food with the potential to cause an adverse health effect (1).

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**Indicator-Based Surveillance (IBS)**

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The systematic (regular) collection, monitoring, analysis and interpretation of structured data, i.e. of indicators produced by a number of well-identified, mostly health-based, formal sources (20).

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**Official control**

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Any form of control that the competent authority performs for the verification of compliance with food law, including animal health and animal welfare rules (48).

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**Outcome**

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Intended effects or results that contribute to achieving the national food control system objectives. Outcomes may be categorized at different levels, such as ultimate, high-level, intermediate, preliminary or initial (47).

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**One Health**

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An integrated, unifying approach that aims to sustainably balance and optimize the health of people, animals and ecosystems. It recognizes the health of humans, domestic and wild animals, plants and the wider environment (including ecosystems) are closely linked and inter-dependent. The approach mobilizes multiple sectors, disciplines and communities at varying levels of society to work together to foster well-being and tackle threats to health and ecosystems, while addressing the collective need for clean water, energy and air, safe and nutritious food, taking action on climate change, and contributing to sustainable development.<sup>6</sup>

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**Risk**

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Is a function of the probability of an adverse health effect and the severity of that effect, consequential to a hazard(s) in food (50).

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<sup>6</sup> Tripartite and UNEP support OHHLEP's definition of "One Health" - Joint Tripartite (FAO, WOA, WHO) and UNEP Statement; 2021 (<https://www.who.int/news/item/01-12-2021-tripartite-and-unesp-support-ohhlep-s-definition-of-one-health>).

## ANNEX 2: Food safety targets for 2030: a proposed method to ignite countries' commitments towards reducing the burden of foodborne disease

### Background

**F**ood safety is vital for achieving many of the SDGs, including ending poverty and hunger, and promoting health and well-being. Unsafe food can cause illness and death, keeping people from working and thriving (19) and children from achieving their potential growth. In the context of the WHO's Thirteenth General Programme of Work (GPW 13) 2019-2023 (56), technical programmes, including food safety, are required to align their efforts to create an area-specific measurement system that allows health impact to be measured accountably.

Despite food safety's relevance in public health and its contribution to the SDGs, to date, there is no global monitoring system that is acknowledged and internationally agreed upon. There is thus an urgent need to develop a mechanism to measure the impact of all the food safety efforts undertaken by WHO, Member States and other stakeholders to inform their actions and investments because what is not measured cannot be managed.



## A new food safety strategy proposed accountability framework

In 2020, Member States requested WHO to update a new global food safety strategy through the assembly resolution (WHA73.5) (8). The strategy, advised by an *ex professo* Technical Advisory Group,<sup>7</sup> includes an accountability framework to measure the progress of the implementation strategy and ignite action. This framework proposes three high-level indicators: one outcome indicator that measures a high fraction of the burden of FBDs, and two process indicators that measure the national capacities to detect and manage food safety events. The process indicators are not directly linked to reduction of the impact indicator, but to achieve process indicators, many aspects of the food safety systems need to be in place and will contribute to the reduction of cases of diarrhoea. The rationale for their selection and proposed target towards 2030 is explained as follows:

**Table 1. Indicators proposed for the WHO Global Strategy for Food Safety and targets**

Indicator	Type	Source	Indicator as of 2022	Target by 2030
Foodborne diarrhoeal disease incidence estimated per 100 000 population	Outcome indicator (impact)	WHO global estimates on foodborne disease burden informed by FERG <sup>8,9</sup>	4 154*	40% reduction in the global average
Multisectoral collaboration mechanism for food safety events	Capacity indicator (progress)	International Health Regulations (2005): State Party Self-Assessment Annual Reporting Tool (57)	57% of countries with at least 80% capacity**	100% of countries with at least 80% capacity
Surveillance of foodborne diseases and contamination		International Health Regulations (2005): Joint External Evaluation Tool <sup>10</sup>	1.5	Global average capacity score 3.5

\* The indicator of 4 154 cases of foodborne diarrhoeal disease / 100 000 population refers to the global estimated number of cases from the five foodborne pathogens: *Campylobacter* spp., Enteropathogenic *E. coli* - EPEC, Enterotoxigenic *E. coli* - ETEC, Shiga toxin-producing *E. coli* - STEC, and Non-typhoidal *Salmonella* Enterica. This indicator was collected from FERG and refers to data from 2010 that was published in 2015. FERG 2021-2024 is updating this data. <https://www.foodbornediseaseburden.org/ferg/estimates>

\*\*Data collected from the 2020 report from 171 Member States.

## Rationale for proposed indicators and targets

All the proposed indicators meet the following characteristics: (1) relevancy, that is to be fit to measure the intended public health concern arising from the FBDs; (2) sensitivity, to actions to detect and motivate changes in the food system; (3) measurability, with agreed upon methodologies; and (4) feasibility to collect through existing mechanisms within a reasonable frequency.

<sup>7</sup> Members of WHO Technical Advisory Group on Food Safety: Safer Food for Better Health. World Health Organization (WHO) (<https://www.who.int/news-room/articles-detail/public-notice-and-comments-to-members-of-who-technical-advisory-group-on-food-safety-safer-food-for-better-health>).

<sup>8</sup> Foodborne Disease Burden Epidemiology Reference Group (FERG). Geneva: World Health Organization (WHO) ([https://www.who.int/groups/foodborne-disease-burden-epidemiology-reference-group-\(ferg\)](https://www.who.int/groups/foodborne-disease-burden-epidemiology-reference-group-(ferg))).

<sup>9</sup> Terms of Reference for the Foodborne Disease Burden Epidemiology Reference Group (FERG) 2021-2024. Geneva: World Health Organization (WHO); 2021 (<https://www.who.int/docs/default-source/food-safety/call-for-experts/tor-for-reference-ferg-31aug2020.pdf>).

<sup>10</sup> The Global Health Observatory. Food safety (IRH 2010-2017). Geneva: World Health Organization (WHO) (<https://www.who.int/data/gho/data/indicators/indicator-details/GHO/food-safety>).

## Definitions and targets of the indicators proposed

*Outcome indicator (impact):* Foodborne diarrhoeal disease incidence estimated per 100 000 – attributable fraction of diarrhoea due to food contamination; the rationale for proposing this indicator is that in 2010, 91% of the FBDs incidence was diarrhoeal, 40% of which were observed among children under 5 years of age, and 16% of the diarrhoeal deaths of children in that age group is attributed to food (58).

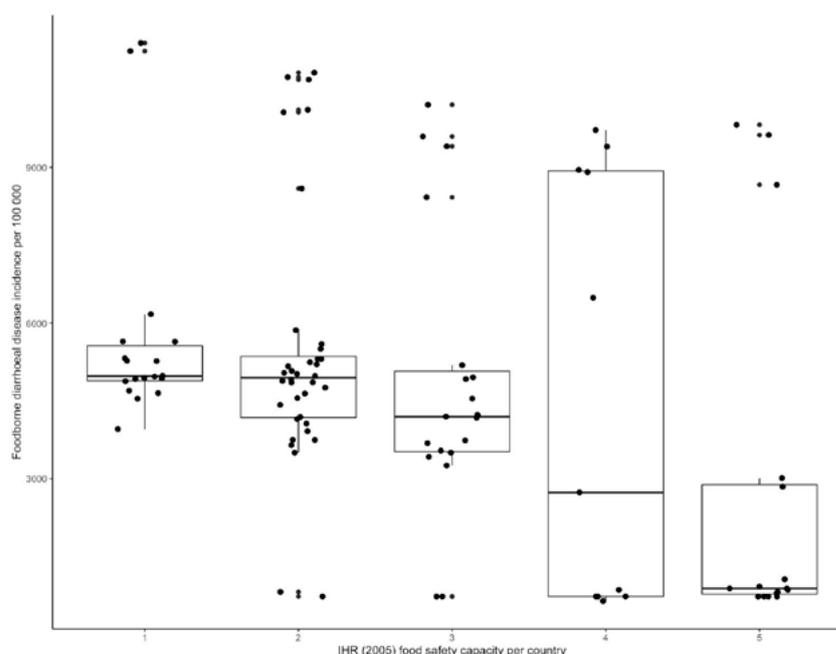
The proposed target for the foodborne diarrhoeal disease incidence estimated per 100 000 is to achieve **40% reduction in the global average until 2030 (baseline 2010)**.

The lack of estimates before or after the 2010 global burden of FBDs exercise precludes looking at the countries' observed trend patterns. Instead, WHO proposes setting targets based on the association between countries' incidence of foodborne diarrhoeal diseases and their surveillance capacity, based on the indicator where data existed. This measure establishes mechanisms for detecting and responding to FBDs and food contaminations as a proxy for surveillance capacity.

As the incidence rate is influenced not only by national surveillance capacity, it is expected that countries with similar level of capacity might be in different incidence levels based on other factors such as status of economic development, general sanitation (WASH),<sup>11</sup> and food systems and market value chains, etc.

Fig. 1 depicts the association between national surveillance capacity (indicators P6.1.(2005-2016) and P.6.2 (2018-2021)) measured by IHR: Joint External Evaluation Tool) with foodborne diarrhoeal incidence estimation. For this analysis, foodborne diarrhoeal disease incidence estimated per 100 000 population was considered for five pathogens: *Campylobacter* spp., Enteropathogenic *E. coli* - EPEC, Enterotoxigenic *E. coli* - ETEC, Shiga toxin-producing *E. coli* - STEC, and Non-typhoidal *Salmonella* Enterica.<sup>12</sup> It can be observed that there is a tendency towards reduction of foodborne diarrhoeal disease incidence as capacity scores increase. However, the only significant jump, based on the 100 countries with data, is detected only when the national surveillance capacity improves from score 3 (or less) to score 5.<sup>13</sup>

**Fig. 1. Boxplots of foodborne diarrhoeal disease estimated incidence (five pathogens, y-axis) per 100 000 by IHR (2005) food safety capacity per country (scores 1-5 per country, x-axis)**



<sup>11</sup> Water, sanitation and hygiene (WASH). World Health Organization (WHO) (<https://www.who.int/health-topics/water-sanitation-and-hygiene-wash>).

<sup>12</sup> Data presented by FERG.

<sup>13</sup> Due to the small number of countries with score 4, the association proposed showed higher variability as shown in Fig. 1 and it was not possible to analyse the level of reduction for this score.

Looking at the incidence of the third quartile (the top 25% highest incidence levels) within each of the capacity levels in Table 4, there is around 40% relative reduction of diarrhoeal incidence when going from level 3 to 5. This, coupled with the fact that the move from level 3 to level 5 makes countries in full capacity to rapidly detect and respond to FBDs and food contamination is our ultimate goal. Targeting a 40% reduction in foodborne diarrhoeal diseases by 2030 is a good balance between feasibility and aspiration.

**Table 2. Foodborne diarrhoeal disease incidence estimated (five pathogens) per 100 000 per years by national surveillance systems in place for the detection and monitoring of foodborne disease and food contamination**

Scores for surveillance of foodborne diseases and contamination		1 (n=18)	2 (n=36)	3 (n=19)	4 (n=11)	5 (n=16)	Not scored (n=94)	Total (n=194)
FBD incidence estimated per 100 000 per	Q1	4891	4181	3524	734	780	887	887
	Median	4977	4946	4197	2738	887	3535	4244
	Q3	5561	5357	5073*	8931	2888*	5955	5734

n = number of countries per score

Five pathogens considered: *Campylobacter* spp., Enteropathogenic *E. coli* - EPEC, Enterotoxigenic *E. coli* - ETEC, Shiga toxin-producing *E. coli* - STEC, and Non-typhoidal *Salmonella* Enterica.

\*Significant difference considering the interquartile distance

*Process indicator 1 (progress):* Multisectoral collaboration mechanism for food safety events; this is the food safety indicator of the IHR (2005) State Party Self-assessment Annual Reporting Tool (45) (since 2018). It measures the capacity to detect, investigate and respond to food safety events and is annually reported by all member states as mandated with a high response rate (88%) in 2019. The classification criteria used by countries for self-assessment is based on levels from 1 to 5 (Table 3) and are reflected in the report as a percentage from 20% to 100%, respectively. In other words, it means that a country with level 3 has 60% of the capacity required to detect, investigate and respond to food safety events.

**Table 3. Criteria for self-assessment of the progress indicator on multisectoral collaboration mechanism for food safety events**

Levels	IHR (2005) food safety indicator (C4.1) under State Party Self-Assessment Annual Reporting criteria for multisectoral collaboration mechanism for food safety events
1	A multisectoral collaboration mechanism that includes an INFOSAN Emergency Contact Point is under development or the existing multisectoral collaboration mechanism is outdated.
2	A multisectoral collaboration mechanism that includes an INFOSAN Emergency Contact Point is in place at the national level AND communication channels between the INFOSAN Emergency Contact Point, the National IHR Focal Point and all relevant sectors for food safety events including emergencies have been established at the national level.
3	A multisectoral collaboration mechanism that includes at least one INFOSAN Focal Point is in place at the national, intermediate and local levels, as appropriate to the structure of the country.
4	Communication channels between the INFOSAN Emergency Contact Point, the National IHR Focal Point and all relevant sectors for food safety events including emergencies, at the international level, if applicable, have been established.
5	A multisectoral collaboration mechanism has been assessed, monitored and reviewed on a regular basis in order to strengthen capacities AND formalized communication channels between the INFOSAN Emergency Contact Point, the National IHR Focal Point, INFOSAN focal points and other relevant sectors for food safety events including emergencies at national and international level have been tested, reviewed and updated.

\* In the IHR (2005) State Party Self-Assessment Annual Reporting Tool levels are scored as percentages, which range from 20% (level 1) to 100% (level 5).

The proposed target for this indicator is **100% of countries with at least 80% capacity** (baseline 2018), which means that all countries will have at least level 4. The current global data shows that 57% of countries are at this level.

Based on the results from IHR (2005) state party annual reports from 2018, 2019 and 2020 (57), 28% of the countries that provided data (51/182) have increased at least one capacity level in the last two years (2018–2019 or 2019–2020). Therefore, it appears sensible to aim that all countries continue to increase the capacity levels to achieve at least level 4 (80% implementation) by 2030, given that the implementation of multisectoral coordination doesn't require a high financial investment.

**Note:** The African Food Safety Index has a similar target of 100% for “policies and capacity”.

*Process indicator 2 (progress):* Surveillance systems in place for the detection and monitoring of foodborne diseases and food contamination; this is one of the food safety capacity indicators under the International Health Regulation (2005) (IHR, 2005). It measures the capacity to detect food safety events and is monitored through the Joint External Evaluation (JEE) (44) process (voluntary, national self-assessment and external mission assessment). It is scored categorically from 1 to 5 as follows.

**Table 4. Assessment of the progress indicator on foodborne disease surveillance**

Scores	IHR (2005) food safety indicator (P.6.1) under JEE assessment criteria for surveillance of foodborne diseases and contamination
<b>1- No capacity</b>	No or very limited surveillance system in place for FBDs or for food contamination (chemical and microbiological) monitoring.
<b>2- Limited capacity</b>	Country has IBS <sup>14</sup> or EBS <sup>15</sup> and monitoring system in place to monitor trends and detect foodborne events (outbreak or contamination).
<b>3- Developed capacity</b>	IBS or EBS system includes laboratory analysis to assign etiology for FBDs or origin of contamination event and investigate hazards in foods linked to cases outbreaks or events.
<b>4- Demonstrated capacity</b>	Country has capacity to undertake rapid risk assessments of acute foodborne events at the national and subnational levels.
<b>5- Sustainable capacity</b>	Country has a surveillance system in place that integrates information from the entire food chain, including timely and systematic information exchange, to enable a better understanding of risk and mitigation possibilities.

The proposed target for this indicator is a **global average capacity score of 3.5** (baseline 2016 – 100 countries).

<sup>14</sup> Indicator-Based Surveillance.

<sup>15</sup> Event-Based Surveillance.

An analysis was conducted based on existing data on JEE tool (2016) which covers established mechanisms for detecting and monitoring FBDs and food contamination. The result of the first edition of the JEE tool was used as a proxy for surveillance capacity because the new IHR (2005) JEE tool was revised in 2018, and the indicator has evolved.<sup>16</sup> As a result, data from the newest tool, collected after 2018, is available from only 20 countries to date. The available data from the first edition was used given the very close interpretation.

Currently, the global average capacity level ranges between 1.5 and 2.5, considering worst-case scenarios where countries with no data ( $n=94$ ) are considered to have zero capacity to simply ignore those countries with no data in the analysis. Countries need to be incentivized to have at least a score of 3 which requires laboratory analysis capacity in place and thus is an inflection point for the reduction of diarrhoeal, as shown in Fig. 1. If countries that have no data or score 1 improve their capacity and reach score 3 and the other countries increase one level, then the global average would rise to 3.5. Thus, this is not an over-ambitious target, considering the target is a 40% reduction in incidence and this indicator as one of the contributors for reaching that target.



<sup>16</sup> Food safety indicators under JEE tool (2018) are: 1) P6.1. Surveillance of foodborne diseases and contamination; and 2) P6.2. Response and management of food safety emergencies

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