THE FUTURE OF FOOD SAFETY
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THE FUTURE OF FOOD SAFETY

IT IS PARAMOUNT THAT WE FIND SUSTAINABLE WAYS TO CULTIVATE, PRODUCE AND CONSUME SAFE AND HEALTHY FOODS WHILE PRESERVING OUR PLANET’S RESOURCES.

Cover photo: Azerbaijan - Vandam village, fresh fruit is displayed at a roadside produce stand. ©FAO/Tofik Babayev
GUATEMALA

Fruit and vegetables stall at the green market

©Pep Bonet/NOOR for FAO
INTRODUCTION

Today’s global challenges are transforming the way we produce, market, consume and think about food.

Ready access to safe and nutritious food is a basic human right. Yet every year around the world, over 420,000 people die and some 600 million people – almost one in ten – fall ill after eating contaminated food. In fact, foodborne hazards are known to cause over 200 acute and chronic diseases from digestive tract infections to cancer.

The ramifications of the cost of unsafe food, however, go far beyond human suffering. Contaminated food hampers socioeconomic development, overloads healthcare systems and compromises economic growth, trade and tourism. Opportunities of an increasingly-globalized food market are lost to countries unable to meet international food safety standards. Food safety threats cause an enormous burden on economies from disruptions or restrictions in global and regional agri-food trade, loss of food and associated income and wasted natural resources.

Today’s global challenges are transforming the way we produce, market, consume and think about food. The most pressing challenges revolve around a growing population and increased food demands compounded by the...
adverse impacts of environmental degradation, climate change, water scarcity, and loss of biodiversity, conflict and socio-economic inequities. Hunger is on the rise and preventable foodborne diseases continue to affect millions annually. Food safety issues further hinder global food security and our collective goal of achieving the Sustainable Development Goals by 2030, and exacerbates the poverty cycle affecting the most vulnerable populations.

Our cities are changing, transforming our food systems. With rapid urbanization, cities need to keep food safety and sustainable food systems planning high on their agenda. Today, half of the world’s population lives within three hours of a small city and town or on only three percent of the Earth’s surface. By 2050, this number is expected to increase to 60 percent. This means that the issues of food safety, food production and distribution will take on even greater importance in strategic discussions on sustainable development and growth.

No matter how much our world continues to evolve and challenge us, the greatest danger is that we fail to protect and safeguard our food systems. It is paramount that we find sustainable ways to cultivate, produce and consume safe and healthy foods while preserving our planet’s resources.
KEY MESSAGES

Food safety is an integral part of the Sustainable Development Goals.

When food is not safe, human development simply cannot take place. In its plan of action for people, planet and prosperity, the 2030 Agenda calls for everyone, in particular the poor and vulnerable, to have access to safe, nutritious and sufficient food all year round. It pledges to ensure healthy lives and promote well-being, which are essential to sustainable development.

Unsafe food takes a huge toll on human health and the economy.

Every year more than 600 million people fall ill and 420,000 die from eating food contaminated with bacteria, viruses, parasites, toxins or chemicals. Unsafe food accounted for 33 million disability-adjusted life years in 2010. As for the economic price tag, unsafe food costs low- and middle-income economies alone about US$ 95 billion in lost productivity annually and can curtail trade.

Agriculture is under pressure, and food production is changing with consequences for food safety.

In a world of accelerating change, the need for food to be safe remains a constant. As the world is facing an unprecedented convergence of pressures from socio-economic, environmental and political fronts, a shift towards sustainable agricultural practices across all sectors and the whole supply chain is required to ensure a viable, sufficient and nutritious supply of safe food. Such a change must minimize environmental impacts, mitigate climate change, and promote economic growth and social equity.

From production to consumption - food safety is a shared responsibility.

Food safety is everyone’s responsibility. Today, food is produced and processed in greater volumes and distributed over greater distances than ever before. Widespread collaboration and contributions of all actors
across the food supply chain, underpinned by robust governance, agreed international standards and harmonized regulations, are essential to food safety.

**Good nutrition requires safe food.**

Unsafe food prevents the suitable uptake of nutrients and renders it unsuitable for human consumption and can lead to long-term developmental delays in children. Poor nutrition makes people more susceptible to diseases. It is a vicious cycle that must be broken. Sustainable Development Goal 2, which is about ending hunger, achieving food security, improving nutrition and promoting sustainable agriculture, can only be achieved when food is safe for people to eat.
If it is not safe, it is not food. Food security is achieved when all people, at all times, have physical and economic access to food that meets their dietary needs for an active and healthy life. Food safety plays a critical role across the four dimensions of food security – availability, access, utilization and stability.

The increased globalization of the world’s food supply means populations worldwide are more exposed to food hazards. This is of particular concern for countries that rely heavily on food imports.

Many developing countries import a significant share of the good supply for their population. Some – such as the Pacific islands – rely almost entirely on food imports to ensure food security.

Higher volumes of imported foods, together with the diversification of origin and growing complexity of the technologies used for traditional monitoring approaches, based on intermittent or irregular inspections at borders, is no longer considered adequate.

Therefore, a specific challenge for imported food is that competent authorities in charge of official controls have no direct oversight over the production process of their trading partners. With the development of trading relationships, increased dialogue between competent authorities of importing and exporting countries, use of certification mechanisms and improved oversight of the importers community are some of the available options to strengthen the effectiveness of imported food controls.

Regardless of where the food is produced, consumers have the right to expect that the food they buy is safe and of the expected quality. FAO works with governmental authorities, with local industry and other relevant stakeholders to ensure that this expectation is met.

SAFE FOOD ENHANCES LIVELIHOODS AND BOOSTS TRADE OPPORTUNITIES.

Chemical residues and microbiological contamination
continue to pose public health risks and lead to trade disruptions with substantial economic and social costs. Opportunities of the global food market are lost to countries that are unable to meet international food safety standards.

In addition, at the local level, farmers and producers who meet consumers’ growing demands for more sustainably-produced foods have the opportunity to improve their livelihood and foster economic development in rural communities.

PROTECTING HEALTH, FACILITATING TRADE
Codex Alimentarius
Consumer protection has existed since ancient times. The Assyrians determined weights and measurements for cereals, the Egyptians used scrolls as labels for certain foods, the Greeks inspected beer and wine to ensure it was in good condition, and the Romans had a State system...
FOOD SAFETY IS FOOD SECURITY

To prevent fraud and root out poor-quality products.

Today, protecting the health of consumers ranges from inspecting food additives and pesticide residues to preventing chemical and microbiological contamination or assessing the safety of modern, at times controversial, practices such as genetically modifying foods or using growth promoting antimicrobials in animal production. While times have changed the goal to protect consumers remains the same.

The Joint FAO/WHO Food Standards Programme implemented by the Codex Alimentarius Commission is an international inter-governmental food standards setting body. Its standards are published as the Codex Alimentarius. This “food code” covers the entire production chain, allowing governments to establish science-based, internationally acceptable standards in order to establish criteria for food to ensure safety and harmonize trade food, taking into account emerging challenges and opportunities.

Codex has worked on food safety and trade for over 50 years. Since 1963, Codex has developed hundreds of internationally recognized standards, guidelines and codes of practice. It has been recognized by the World Trade Organization since 1995 as the benchmark standards for national food safety regulations and the basis for international food trade – they are science-based standards, adopted through global consensus. The Codex Alimentarius is made up of over 300 texts that range

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SWAZILAND

Red cabbage growing in an orchard field which is sold at a wholesale market that was established to facilitate access to market opportunities for smallholder producers and link them with buyers. ©FAO/Believe Nyakudjara
from general to specific standards and include a vast number of numerical limits for additives, contaminants, pesticides residues and veterinary drugs.

Codex is, therefore, the invisible link between those working in the food chain and the consumer. The Codex Alimentarius is vital for governments, industries and other actors in helping to ensure that food is safe to eat regardless of the borders that it has crossed.

**INVESTING IN SUSTAINABLE FOOD SYSTEMS PAYS OFF.**

Sustainable food systems are the future of food and agriculture. FAO supports governmental authorities, local industry and all those in supply chains to ensure that the food available on domestic and international markets is safe and of the expected quality. Each year, the impact of unsafe food causes production loses of around USD 95 billion in low- and middle-income economies. Safe food production improves sustainability by reducing food waste and by enabling market access and productivity, which drives economic development and poverty alleviation, especially in rural areas.
Science-based decision-making increases public health and protects trade. Risk assessment provides policy makers with the information and evidence they need for effective and transparent decision-making, contributing to better food safety outcomes and improvements in public health. FAO and WHO expert scientific bodies provide the most robust and up-to-date scientific advice available.

**STRATEGY AND SCIENCE: FAO’S FOOD SAFETY APPROACH**

FAO works closely with its Members and international food safety experts to provide guidance for developing and emerging countries so that “the best available evidence” is used to inform food safety decisions. This guidance is tailored to specific country needs, especially those that may be data poor or have less mature control systems and are keen to promote highly participative approaches to foster ownership of the process and results. The availability of agreed decision-making tools facilitates an inclusive and transparent process for food safety decisions, based on a broad set of factors rather than a single consideration.

Making sound strategic decisions is the primary responsibility of food safety risk managers, who must weigh multiple criteria and sometimes complex risk interactions. Decisions often require balancing food safety priorities with resources, following multiple policy recommendations and selecting the most appropriate intervention to minimise risks. To be effective in building strong food safety programmes, food safety risk managers need to influence high-level decisions based on best available data and evidence to prioritize food safety in their countries. Also in determining appropriate action, decision-makers often need to consider the consequences relating to more than one risk factor, for example, the multiple impacts on public health, trade, food access and security.

Science is central to the work of FAO on food safety and quality along the supply chain. In close
collaboration with WHO, FAO provides neutral and independent scientific advice as the essential basis for the international food safety standards, guidelines and codes of practice established by the Codex Alimentarius Commission, and for supporting the development of modern food control systems by national authorities such as whole genome sequencing for epidemiological surveillance for foodborne pathogens. In developing high quality globally relevant scientific advice, consideration is given to the entire food production chain as appropriate as well as all relevant and accessible data and regular updates are made to the methods and approaches used to ensure consistency with the most recent developments. Better data is needed to understand the far-reaching impacts of unsafe food.
The Joint FAO/WHO Expert Committee on Food Additives (JECFA) has been meeting since 1956 to provide scientific advice on food additives, contaminants and residues of veterinary drugs in food as well as principles and guidance for safety assessment of chemicals in food.

The Joint FAO/WHO Expert Meetings on Microbiological Risk Assessment (JEMRA) began in 2000 as an international scientific expert group that evaluates different aspects of microbiological hazards in the food supply.

The Joint Meeting on Pesticide Residues (JMPR) is an expert ad hoc body administered jointly by FAO and WHO to harmonize the requirements and risk assessment on pesticide residues. The JMPR has met annually since 1963 to conduct scientific evaluations of pesticide residues in food, providing advice on the acceptable levels of pesticide residues in food traded internationally.

Joint FAO/WHO Expert Meetings on Nutrition (JEMNU) was established in 2010 to strengthen the role of FAO and WHO in providing scientific advice on nutrition to Member States and bodies such as the Codex Alimentarius Commission and in particular the Codex Committee for Nutrition and Foods for Special Dietary Uses (CCNFSDU) with a view to set appropriate health-protective and trade-inclusive global nutrition standards.
CORE PRINCIPLES FOR SCIENTIFIC ADVICE

- **Soundness:** scientific excellence, evidence-based, rigorous and repeatable
- **Responsibility:** accountability, safeguarding the integrity of the process
- **Objectivity:** includes neutrality of the experts and of the advice provided
- **Fairness:** of the process, and respect for all participants and their scientific views
- **Transparency:** of both the process and the scientific advice
- **Inclusiveness:** balance of skills and expertise, minority scientific opinion, geographical and socioeconomic balance without compromising excellence
Human health is closely interlinked with the health of animals and the environment around us.

FAO promotes a “One Health” approach as an integrated way of preventing and mitigating health threats across the Animal-Human-Plant-Environment interface. This is clearly demonstrated by transmission of microorganisms to people through food—from fruits and vegetables contaminated with soil and from animal-sourced foods. Thus, FAO promotes practices that decrease the likelihood of live animals carrying pathogens transmissible to people and prevent the transfer of contaminants from the environment to foods. These are important and effective “One Health” approaches to reduce human illnesses.

FOOD SAFETY AND PRODUCE, LIVESTOCK AND FISH
FAO combines expertise in sustainable food production across the agricultural sectors and food safety disciplines to identify sources of food safety risk and to develop measures to prevent or minimize these risks at the most appropriate stages of the chain. Working with concerned stakeholders at national and local levels from both public and private sectors, FAO helps to strengthen the management of food safety in specific sectors and formulate strategies that promote the application of Good Hygienic Practices and ensure compliance with national and international food safety requirements.

Food safety and produce
FAO teams made up of Food Safety and Plant Production specialists work with national institutions to develop guidelines/codes of practice that integrate food safety considerations into sustainable agricultural practices. Long-term impact is ensured through capacity building activities with local, national and regional partners.

Selected examples:
- Mycotoxin can affect staple foods such as maize and sorghum and high value commodities such as coffee and cocoa with important consequent food security implications for poor and vulnerable populations. These toxins are implicated in a wide range of health effects that include liver and kidney damage, among others. FAO and WHO produced a user-friendly and freely-available online tool to guide national authorities and operators to sample 26 mycotoxin-commodity combinations.
- Farmer Field Schools (FFS) have proved to be an effective vehicle for enabling farmers to understand and adhere.
to good practices. FFS are developed to fully integrate food hygiene with production issues such as integrated pest management techniques.

FAO works with national institutions to build their capacities to design and implement programmes to improve food safety in the primary production of fruit and vegetables. This includes programmes focusing on good practices on farm as well as on monitoring pesticide and other contaminants.

Food safety and livestock

Improving the safety of foods of animal origin involves guidance on good practices in animal feeding, animal husbandry, slaughter and handling and processing of animal products. FAO experts from animal production, animal health and food safety unit work together to ensure a science-based and integrated approach to managing food safety risks related to foods of animal origin, including Antimicrobial Resistance (AMR).

Food producers play a vital role in stopping the spread of antimicrobial resistance. Antimicrobial drugs are essential to protect both human and animal health. However, antimicrobials, if misused in the livestock, aquaculture or crop production sectors, can contribute to antimicrobial resistance (AMR) – one of the world’s most pressing public health threats. AMR causes a reduction in the effectiveness of medicines, making infections and diseases difficult or
impossible to treat in animals, plants and humans alike. Each year, an estimated 700,000 people die around the globe because of antimicrobial-resistant infections, with the largest toll is in low- and middle-income countries. Good hygiene practices in agriculture, food production, processing and distribution are required to maintain food safety and minimize the transmission of AMR through the food chain to people. If antibiotics are not used appropriately, antimicrobial residues in food can also pose health hazards to consumers. FAO encourages food production practices that reduce the use of antimicrobials; enhance food hygiene and sanitation during processing to limit cross-contamination; and monitor progress in producing food that is free from antimicrobial-resistant pathogens.

Food safety and fish and fishery products
Improving the quality and safety of fish products requires interventions at various stages of the value chain. Many countries call on FAO fisheries and food safety experts to assist in developing the capacities for fish inspection and for promoting the application of good practices by all operators in fisheries and aquaculture: fishers, fish farmers, fish handlers and processors. FAO uses participatory approaches to assess training needs and to design and implement programmes for longterm capacity building.

For example, Scombrotoxin Fish Poisoning (SFP) often called ‘histamine poisoning’ occurs when certain species of marine fish – including tuna, mackerel, sardines and anchovy – are stored improperly, a naturally-occurring amino acid of the fish is converted to histamine by bacterial contaminants. In some parts of the world, SFP is a major cause of food-borne illness.

WRITING THE RULES: NATIONAL LEGAL FRAMEWORKS
Modern food legislation is a key pillar for an effective food control system. In all countries, food is governed by a complexity of laws and regulations which set out the government’s requirements to be met by food chain operators to ensure the food is safe and of adequate quality.

FAO has a unique reservoir of knowledge and information to assist countries in drafting or amending legislation relevant to food safety and quality. This invaluable resource and collective wisdom has been accumulated over more than 40 years of engagement with different legal traditions around the world. FAO can assist in promoting the design of workable and appropriate national regulatory frameworks in all areas under FAO’s mandate, as well as provide assistance through legal and institutional assessments; support to a participatory legal reform processes; preparation of draft laws; and capacity development activities for lawyers and regulators. Such capacity development helps countries to improve their abilities to autonomously formulate appropriate legislation.

Assistance is tailored to each country’s situation, with attention to the national legal framework and tradition, as well as to the
implementation of applicable international agreements and international reference standards. To date, FAO has assisted a broad range of countries and regional organizations across five continents in revising their legislation.

FAO also has the world’s largest legislative database (FAOLEX) on food and agriculture, including natural resources management (fisheries, land, water and forestry), and provides legal information by publishing legislative studies and legal papers online, including good regulatory practices (GRPs) for drafting or revising national legal frameworks. These publications cover different SPS-related topics, not only food safety, but also animal and plant health and biosafety. FAOLEX has been running since 1995. It is continuously updated, with an average of 8,000 new entries per year. It currently contains legal and policy documents drawn from more than 200 countries, territories and regional economic integration organizations and originating in over 40 languages.

**Governance enables safe and nutritious food for all.** National governance is critical for ensuring that we all can eat safe and nutritious food. FAO is supporting governments in transitioning the food control systems into governance mechanisms that foster agriculture, the production of safe and nutritious foods and the access to global trade. An enabling governance at national level is critical to end hunger and alleviate poverty.
International emergency response systems ensure coordinated action when combatting outbreaks of foodborne illness globally. FAO jointly with WHO leads global information and prevention networks involving national food safety authorities and experts to prevent, prepare for and respond to food safety emergencies.

FAO assists countries in building food safety emergencies prevention and management systems to strengthen country resilience to food chain crises.

In order to promote and facilitate the rapid exchange of information during food safety related events, FAO and WHO coordinate the International Food Safety Authorities Network (INFOSAN). Operating in its 15th year, INFOSAN has facilitated communication across borders, and between network members, during hundreds of food safety emergencies. In such instances, INFOSAN, a practical and reliable tool for information exchange, can mitigate and reduce impacts of a food crisis by allowing risk managers to prevent foodborne illness and save lives by launching

MOLDOVA
Biochemical examination for diagnosis of bacterial diseases (salmonellosis, colibacillosis).
©FAO/Dorin Goian
targeted product recalls and consumer warnings.

A number of recent events have highlighted the important role this network plays to support national response activities. For example, two such events started in 2017 and continued into 2018: an outbreak of salmonellosis linked to infant formula produced in France and exported to more than 80 countries; and an outbreak of listeriosis linked to ready-to-eat meat products produced in South Africa and exported to 15 countries. During both of these events, national INFOSAN Emergency Contact Points provided key information such as destination countries of contaminated products to the INFOSAN Secretariat, which, in turn, notified INFOSAN Emergency Contact Points in importing countries of the details of the affected products to stop distribution. INFOSAN thus relies on proactive participation of members around the world to implement appropriate risk management measures.

Today, INFOSAN connects nearly 600 members from 188 Member States together and its
FOOD SAFETY IN EMERGENCIES

membership continues to grow each year. Commitment to active participation in INFOSAN is one important way in which national government agencies can demonstrate their dedication to improving food safety as a global good.

IMPORTANCE OF PREVENTION OF FOODBORNE OUTBREAKS

The shift in food safety from ‘reaction and response’ to ‘prediction and prevention’ requires holistic and structured approaches to collecting and analysing intelligence for early identification of emerging issues. FAO works with different partners and Member Countries to develop such intelligence and foresight to inform broad food chain decisions and provide guidance on key emerging issues.

It is difficult to estimate the burden of foodborne diseases: only a small fraction is recognised by concerned authorities. The ultimate goal of food safety and public health officials is to prevent such outbreaks. Surveillance systems allow authorities to better understand major food safety risks and to refocus prevention efforts. It also allows early detection of adverse food safety events and prompt and effective response. FAO collaborates with WHO in a number of activities aimed at prevention and management of food safety emergencies.

RAISING AWARENESS TO ARM CONSUMERS

Outbreaks of foodborne illnesses and food recalls can have wide-reaching consequences and impact on consumer confidence in the safety of the food supply. This calls for enhanced food safety risk communication with consumers among all
stakeholders in the agri-food chain, beginning with risk managers and decision-makers. This two-way exchange of information and opinions between all involved is key in restoring confidence and protecting people’s quality of life.

For example, Mali is a country that sought to improve its decision-making approach to food-safety by adopting a risk analysis framework. Already having access to relevant food analysis and consumption data, the food-safety authorities sought FAO’s advice about how to use the data to guide strategic choices and day-to-day food control activities. In 2014, Mali and FAO launched a two-year capacity development programme targeting a broad range of stakeholders. Competent authorities, starting with the national food-safety authority laboratories, private-sector actors, including primary producers, consumers’ representatives, to research institutions, academia, and civil society representatives were trained on how to use their national data to prioritize risks and optimize the management of those risks. As a result, Mali is now able to build monitoring and control programmes for domestic and imported foods based on a practical understanding of risk analysis.
This brochure presents FAO’s work on food safety and the recognition that ready access to safe and nutritious food is a basic human right. Food security is achieved when all people, at all times, have physical and economic access to food that meets their dietary needs for an active and healthy life. Food safety plays a critical role across the four dimensions of food security – availability, access, utilization and stability.

It is paramount that we find sustainable ways to cultivate, produce and consume safe and healthy foods while preserving our planet’s resources. FAO recognizes that the ramifications of the cost of unsafe food go far beyond human suffering. FAO works with governmental authorities, with local industry and other relevant stakeholders to ensure that regardless of where the food is produced, consumers have the right to expect that the food they buy is safe and of the expected quality. This brochure includes examples of FAO’s work, and the importance of science-based decision-making and working together to build the world we want – a Zero hunger world.

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