Food and Agriculture Organization
of the United Nations

GHP – SECTION 1

INTRODUCTION
AND CONTROL OF
FOOD HAZARDS

FAO Good Hygiene Practices (GHP) and
Hazard Analysis and Critical Control Point
(HACCP) Toolbox for Food Safety

GHP – SECTION 1

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CONTENTS

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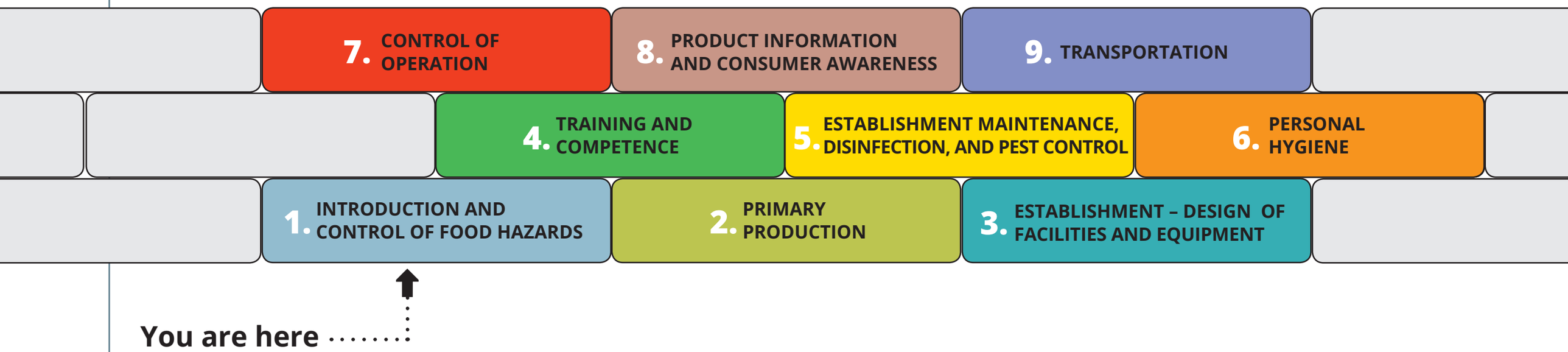
SCOPE AND INSTRUCTIONS FOR USE

This guidance document is part of a toolbox of materials and has been developed to provide users with a good understanding of Section 1, Introduction and control of food hazards of the Codex General Principle of Food Hygiene (CXC 1-1969).

Effective and well-established Good Hygiene Practices provide the foundation for food safety management systems. This tool divides the practices into nine sections, as illustrated by the brick schematic below. The section addressed by the current guidance document is indicated by the arrow.



INTRODUCTION AND CONTROL OF FOOD HAZARDS

CONTEXT

Good Hygiene Practices, or GHPs, form the basis of all **food hygiene systems** that support the production of safe and suitable food. **Food business operators** must be aware of **hazards** that could affect their food and ensure that such hazards are properly managed to protect consumer health. GHPs are the foundation of any effective food safety management programme, and implementing them gives food business operators a system for **controlling** food safety hazards.

In the context of food safety, a hazard can be defined as any agent or substance associated with food that has the potential to cause harm when the food is ingested. Hazards encountered in foods can be categorized as chemical (e.g. pesticides), biological (e.g. pathogens) or physical (e.g. extraneous materials) all of which can **contaminate** food at points along the food chain.

CONTEXT

Rationale

The development, implementation and maintenance of GHPs provide the conditions and activities that are necessary to support the production of safe and suitable food at all stages of the food chain from primary production through to handling of the final product. Applied generally, they assist in controlling hazards in food products.

Learning objectives:

This document provides guidance on:

- introduces the principles and guidelines for applying GHPs throughout the food chain to control hazards and ensure food safety;
- explains the points where chemical, biological and physical hazards can be introduced throughout the food chain; and
- illustrates how to apply GHPs to take a preventative approach to controlling hazards in the food value chain.

CONTEXT

Codex definitions:

Allergen cross-contact: The unintentional incorporation of an allergenic food, or ingredient, into another food that is not intended to contain that allergenic food or ingredient.

Contaminant: Any biological, chemical or physical agent, foreign matter or other substances not intentionally added to food that may compromise food safety or suitability.

Contamination: The introduction or occurrence of a contaminant in the food or food environment.

Control (noun): The state wherein correct procedures are being followed and any established criteria are being met; (verb): To take all necessary actions to ensure and maintain compliance with established criteria and procedures.

Food business operator: The entity responsible for operating a business at any step in the food chain.

Food hygiene system: Prerequisite programmes, supplemented with control measures at CCPs, as appropriate that, when taken as a whole, ensure that food is safe and suitable for its intended use.

Food safety: is the assurance that food will not cause adverse health effects to the consumer when it is prepared and/or eaten according to its intended use.

CONTEXT

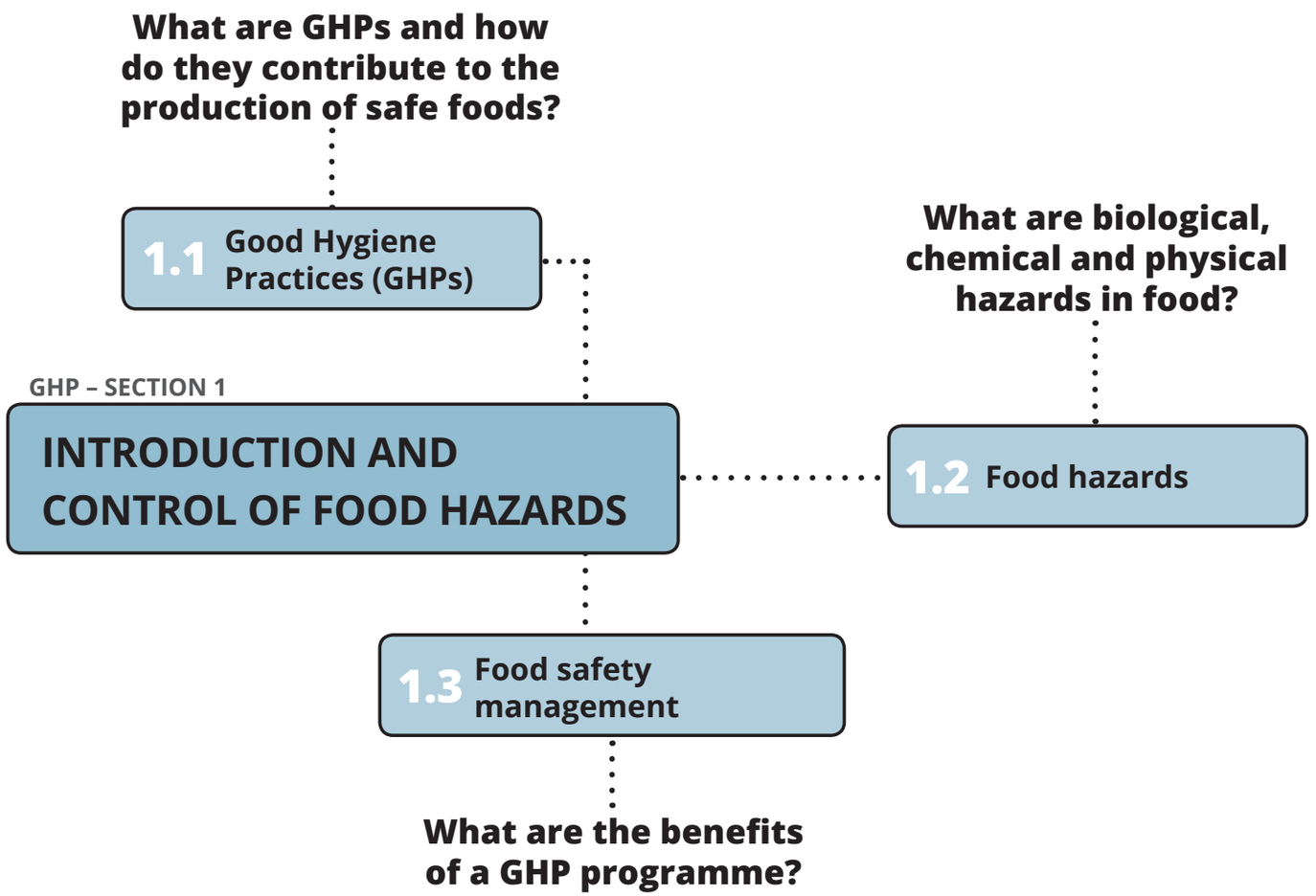
Food suitability: Assurance that food is acceptable for human consumption according to its intended use.

Hazard: A biological, chemical or physical agent in food with the potential to cause an adverse health effect.

Good Hygiene Practices (GHPs): Fundamental measures and conditions applied at any step within the food chain to provide safe and suitable food.

MINDMAP

This section of the guidance is divided into sub-sections. You can jump to a particular sub-section by clicking on it, or return to this page at anytime by clicking on INTRODUCTION AND CONTROL OF FOOD HAZARDS



1.1 GOOD HYGIENE PRACTICES (GHPs)

GHPs are best practices that generally assist in controlling hazards in food products, but depending on the food or the process, certain GHPs may be particularly important to the safety of the product and may require more attention. General GHPs focus on the product, process, facility and personnel. Examples of commodity-specific GHPs that may require more attention is the quality of irrigation water used for fresh vegetables or the handling of allergens in nut-free processing facility or the cleaning on food contact surfaces for ready-to-eat meat products.

The implementation of GHPs provides conditions and activities required to produce safe and suitable food in all stages of the food chain. GHPs help to control hazards (biological, chemical or physical) associated to food, and growing/processing environment.

1.1 GOOD HYGIENE PRACTICES (GHPs)

An effective GHP implementation can only be ensured if the FBOs fully understand:

- the food or commodity;
- the production process;
- the hazards associated with the food operations; and
- the necessary control measures to manage hazards adequately.

GHPs are the first steps towards achieving food safety. When these practices are well-established and effective, but are not sufficient to address all hazards, it will be necessary to implement a HACCP system.

The Codex Alimentarius Commission has developed several commodity-specific Codes of Practices on the General Priniciples of Food Hygiene guidance.

For additional information, please consult the **Further reading** section accessible from the **SECTION LANDING PAGE**.

1.2 FOOD HAZARDS

Along the food production chain, food hazards can contaminate food products and negatively affect the safety of the food product.

Examples of hazards:

- **biological -** pathogenic microorganisms (e.g. bacteria, viruses and parasites)

- **chemical -** naturally occurring chemicals (e.g. allergens and mycotoxins), added chemicals (e.g. pesticides, heavy metals, sanitizers, plasticizers from packaging materials)

- **physical -** extraneous materials (e.g. metal, glass, wood) and bone fragments

Some foods, based on their inherent nature (e.g. pH, moisture content, water activity), or how they are processed (e.g. ready-to-eat, vacuumed packaged) are more susceptible to certain hazards. Examples of well established hazard/commodity combinations include:

- *Clostridium botulinum* in low-acid, canned foods
- mycotoxins in grains
- undeclared allergens in baked goods and multi-ingredient foods
- bone fragments in meat
- *Listeria monocytogenes* in smoked fish

1.2 FOOD HAZARDS

Hazard identification

When undertaking a hazard assessment for a food or process, all potential hazards should be taken into account but the focus should be placed on those likely to occur and be present. When determining relevant and significant hazards for a food or process the following should be considered:

- Historically, what hazards have been associated with the food product/commodity in question?
- Is there any specific guidance provided for the commodity–hazard combination by government or trade associations?
- What are the potential sources of the hazard and likelihood of it being encountered?
- What is the consequence of the hazard to the consumer?

1.2 FOOD HAZARDS

Things to consider

Historic associations: A review of foodborne illness outbreaks, recalls or food safety incidences can highlight hazards associated with products. For example:

- Ground beef has been linked to outbreaks of *E. coli O157:H7* (biological), and recalled for antibiotic residues (chemical) and bone fragments (physical).
- Dried herbs and spices have been recalled for *Salmonella* (biological) and mycotoxins.
- Grains and cereals recalled due to mycotoxins.
- Dried fruit recalled due to stones or pits (physical).

Guidance or regulation: Hazard controls can be prescribed by regulators or trade associations. For example, *Clostridium botulinum* cook for low acid canned soup (biological) or permitted food additives and their condition of use and maximum levels of use. The identification of hazards can be based on historic outbreaks or from risk analysis.

1.2 FOOD HAZARDS

Things to consider

Potential sources of hazards: Controlling food hazards starts with knowing their source and how they can be introduced into raw materials, processes and final food products:

- Water can transfer biological, chemical and physical hazards that may contaminate the product.
- Fecal material from animals or humans can be a source of pathogenic microorganisms that can contaminate foods directly or indirectly (e.g. water, handling, air).
- Food handlers: Humans can harbor and transfer a wide variety of infectious agents (viruses, bacteria, parasites) to products while handling these.
- Unsanitary surfaces: If common food contact surfaces (e.g. slicer, knife) are not cleaned, sanitized or properly maintained then biological, chemical, or physical agents (microorganisms, allergens, etc.) can be transferred between products. In addition, if sanitizers are not food grade or are used inappropriately, they could also represent a chemical hazard.

1.2 FOOD HAZARDS

Chemical hazards

Chemical contaminants in food may be naturally occurring or may be added during the processing of food. Harmful chemicals at high levels have been associated with acute cases of foodborne illnesses and can be responsible for chronic illness at lower levels.

Different types of chemical substances can be present in foods for many reasons. Chemical agents are present in foods either intentionally or unintentionally. Intentional chemical agents can include additives, pesticides, veterinary drugs, and adulterants. Unintentional chemical agents can include sanitizing or other chemicals, environmental chemicals, and naturally existing toxins.

1.2 FOOD HAZARDS

Chemical hazard	Source of contamination in the food chain examples
Pesticide residue exceeding maximum residue limits (MRLs)	• Poor quality pesticides. • Applying higher than recommended dosages. • Dumping or accidental spilling of pesticide into water source or soil.
Heavy metal residues exceeding maximum levels	• Continued use of fertilizers with high heavy metal levels. • Irrigation water.
Non-pesticide chemical agents (sanitizers and cleaning agents, adhesives, lubricants, paint, etc.)	• Use of non-food grade agents. • Contaminated storage containers or equipment. • Oil leaks, paint, grease on equipment in contact with food. • Chemical spillage.
Naturally occurring toxins (mycotoxins, allergens, etc.)	• Unacceptable storage conditions (excess humidity or light leading to mold growth). • Allergen cross-contact.
Intentionally added chemical agents	• Preservatives. • Dyes and other colouring agents.

1.2 FOOD HAZARDS

Approaches to control for chemical hazards

To minimize the effect of unsafe chemicals in foods, **standards** have been developed that define their permitted maximum levels in a food product. Specialized Codex Alimentarius Committees, such as the Codex Committee on Food Additives (CCFA) develop guidance on the control of chemical residues and contaminants in foods. **Farmers, suppliers, and food producers need to properly use appoved chemicals to not exceed Maximum Residual Limits (MRLs) in the foods they produce.**

For additional information on MRLs, please consult the **Further reading** section accessible from the **SECTION LANDING PAGE**.

1.2 FOOD HAZARDS

Intentionally added chemical agents	Unintentionally added chemical agents (contaminants)
• **Maximum Residue Limits (MRLs)** define maximum permitted concentration.	• **Maximum Levels (MLs)** define the maximum concentration of contaminants and natural toxicants.
• **Maximum use levels** ensure that intake of additive does not exceed the Acceptable Daily Intake.	• **Extraneous Maximum Residue Limits (EMRLs)** refer to compounds banned for agricultural uses, which are persistent in the environment.

1.2 FOOD HAZARDS

Biological hazards

Biological hazards are microbiological organisms such as bacteria, viruses, fungi and parasites, and are the main cause of acute foodborne illness in humans. These organisms are commonly associated with humans and with raw products entering the food establishment. Most are killed or inactivated by cooking, and numbers can be minimized by adequate control of handling and storage practices (hygiene, temperature and time).
Different pathogens appear to be adapted for certain food types/food industries. For example:

- *Salmonella* spp. in poultry and eggs
- *Campylobacter* spp. in poultry
- *E. coli O157:H7* in beef
- Tapeworm (*Taenia saginata*) in beef
- *Clostridium botulinum* in canned/tinned foods
- Toxin-producing marine algae in seafood
- *Vibrio parahaemolyticus* in shellfish

1.2 FOOD HAZARDS

Examples of biological hazards

Many of these microorganisms occur naturally in the environment where foods are grown. To grow, microorganisms generally require moisture, food, temperature, and time. Microbial growth is also influenced by the pH of the environment, the presence or absence of oxygen and other competing microorganisms.

1.2 FOOD HAZARDS

Source of contamination	Examples of possible microorganisms of concern
Air	• *Bacillus* spp. • Fungi
Soil	• *Bacillus* spp. • *Clostridium* spp.
Water	• *E. coli* • *Giardia* spp.
Plants	• *Listeria monocytogenes* • Moulds • Yeasts
Animals	• *Salmonella* spp. • *E. coli* • *Campylobacter* spp.
Food handlers	• *Staphylococcus aureus* • Hepatitis • Norovirus
Food manufacturing facilities	• *Listeria monocytogenes*

1.2 FOOD HAZARDS

Types of biological hazards ➡ Bacteria

The majority of reported foodborne disease outbreaks and cases are caused by pathogenic bacteria. They can:

- survive for long periods of time in nature and in food processing environments;
- form biofilms resistant to chemical sanitizers;
- multiply quickly (e.g. doubling every 20 to 30 minutes at 37°C);
- can be beneficial and used to produce foods such as fermented fish and yogurt; and
- can be heat resistant (e.g. spore-formers such as *Clostridium botulinum* or Bacillus cereus).

1.2 FOOD HAZARDS

Types of biological hazards ➡ Fungi

Yeasts and moulds are very hardy and can grow under many conditions, they:

- need oxygen to grow;
- generally are very resistant to heat and other disinfection treatments, especially when present as spores;
- can be beneficial and are used to produce certain foods, such tea and alcohol-containing beverages and cheese; and
- can also be very dangerous as they produce toxins such as mycotoxins, some of which have been linked to cancer.

1.2 FOOD HAZARDS

Types of biological hazards ➡ Parasites

Parasitic infections are commonly associated with undercooked meat products or contaminated ready-to-eat food, they:

• can be introduced through contaminated water or food handlers;

• do not grow in foods;

• cannot be cultured using laboratory methods; and

• can be destroyed by thorough cooking.

Please note that:

• Freezing may kill parasites in raw and undercooked fish.

• Only a small number of organisms are usually needed to cause illness.

1.2 FOOD HAZARDS

Types of biological hazards ➡ Viruses

Viruses can be foodborne/water-borne or transmitted to food by human, animal or other contact. They:

- do not grow in foods;
- can cause illness when present in small numbers;
- are persistent in the environment;
- contaminate foods through water, fecal material and food handlers; and
- generally are resistant against disinfection, especially those that are small and do not contain an envelope in their structure.

1.2 FOOD HAZARDS

Methods to control for biological hazards:

- Preventing the introduction of microorganisms into foods (e.g. food safety measures during primary production, hygienic production premises).
- Inactivating microorganisms in foods (e.g. pasteurising, cooking, sterilising).
- Inhibiting the growth of microorganisms in foods (e.g. modified atmosphere packaging, cool chain).

Depending on the point in the value chain, one or a combination of these three approaches can be applied.

1.2 FOOD HAZARDS

Microbiological criteria

Microbiological testing can be executed to determine acceptability of a product or food lot.

However, this has limitations when assessing the safety of foods (sampling limitations, technological restrictions and length of time to obtain results).

Therefore... **A preventive approach to food safety offers more control than sampling and testing.**

Codex definition:

Microbiological criterion: defines the acceptability of a product or a food lot, based on the absence or presence, or number of microorganisms including parasites, and/or quantity of their toxins/metabolites, per unit(s) of mass, volume, area or lot.

1.2 FOOD HAZARDS

Physical hazards

Physical hazards are foreign objects that can pose harm to consumers, including choking, internal injuries and broken teeth. Typical examples include materials such as glass, wood, metal and stones.

Physical hazards	Source of contamination examples:
From the environment	• Harvesting environment (stones) • Poorly maintained equipment and storage areas
From equipment and processing area	• Broken lighting fixtures and gauges (glass and plastic) • Damaged pallets (wood) • Inadequate cleaning and maintenance
Foreign objects from handling by personnel	• Careless or untrained staff • Unsuitable clothing

1.2 FOOD HAZARDS

Methods to control physical hazards

Physical hazards can be control through observation and mechanical means, such as:

- proper sorting and cleaning of incoming raw materials;
- routine checks and audits of all glass and brittle plastic in the processing environment;
- on-line metal detectors and magnets;
- on-line filters and screens; and
- X-ray technology.

1.3 FOOD SAFETY MANAGEMENT

Foodborne disease and threats to food safety are a significant public health problem. Although government bodies are responsible for producing and enforcing national food safety policies and regulations, all parties in the food production chain are responsible for the safety of the foods they produce or handle. Food is considered safe when it does not cause illness or injury due to the presence of biological, chemical, and physical agents.

Contamination of food products can occur at all points throughout the food production chain. That's why it is important to understand and implement the elements of successful food safety management Food and codes of good practice.

Measures should be taken where necessary to:

- protect food from potential sources of contamination;
- protect food from damage likely to render the food unsuitable for consumption; and
- provide an environment which effectively controls the growth of pathogenic or spoilage microorganisms and the production of toxins by these microorganisms in food.

1.3 FOOD SAFETY MANAGEMENT

What is a GMP programme?

A food business operator's GMP programmes should cover both the safety and quality aspects of food production. They describe the principles, procedures, and means needed to create an environment suitable for the production of safe food.

A GMP programme should describe:

- organizational structures and responsibilities;
- documented procedures and processes; and
- available resources.

GMP programmes should be adapted and continuously improved by performing regular audits, reviews, and updates.

Documentation is a critical part of a GMP programme. Demonstrating compliance to these programmes requires documentation and record keeping to demonstrate how all aspects and areas of concern are managed.

1.3 FOOD SAFETY MANAGEMENT

Goal of a GMP programme: To create a valuable internal source of know-how and to be able to demonstrate to auditors or customers how food safety concerns are managed and controlled.

In their attempt to minimize foodborne illness, most governments incorporate Codex guidelines and recommendations into their food legislation. Food safety authorities require that food processors identify and control steps that are critical to food safety. Compliance with this requirement requires a documented food safety and quality management system.

1.3 FOOD SAFETY MANAGEMENT

Benefits of following good hygiene practices:

- Safe and wholesome food
- Raising customer confidence
- Increased compliance to regulatory requirements
- Minimizing risk of costly food recalls associated with unsafe food
- Creating a workforce that understand the concept of safe food production
- Reducing waste during the whole production process
- Opening up to market opportunities (large distributors that require certified suppliers, access to international markets, etc.)

1.3 FOOD SAFETY MANAGEMENT

Food safety culture

Fundamental to the successful functioning of any food hygiene system is the establishment and maintenance of a positive food safety culture acknowledging the importance of human behaviour in providing safe and suitable food. The following elements are important in cultivating a positive food safety culture:

- Commitment of management and all personnel to the production and handling of safe food.
- Leadership to set the right direction and to engage all personnel in food safety practices.
- Awareness of the importance of food hygiene by all personnel in the food business.
- Open and clear communication among all personnel in the food business, including communication of deviations and expectations.
- Availability of sufficient resources to ensure the effective functioning of the food hygiene system.

FIND OUT MORE

For additional information on the following topics related to this section, please consult the **Further reading** section accessible from the **SECTION LANDING PAGE**.

Where can I find guidelines on the maximum levels for contaminants in food products?

Where can I find more information about microbiological criteria?

Where can I find guidance on GHP specific to meat and meat products?

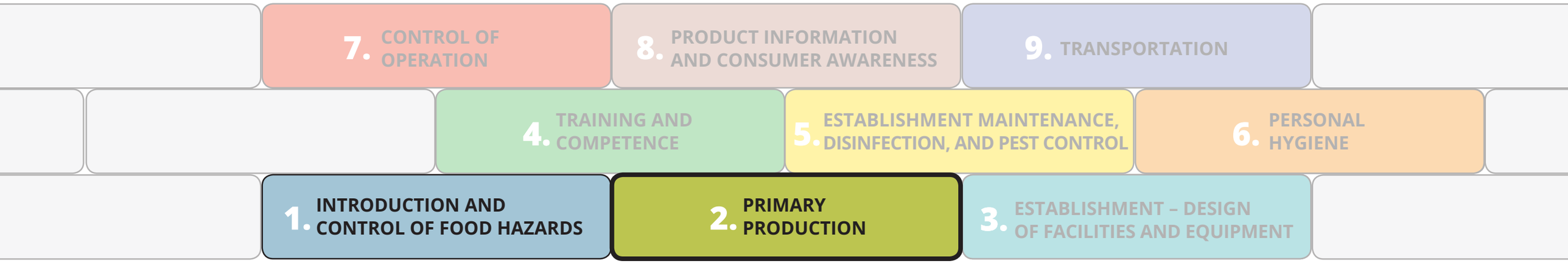
Where can I find guidance on GHP specific to fish and fishery products?

Where can I find information regarding Good Agricultural Practices (GAP) for primary producers?

Where can I find guidance on GHP specific to dairy and dairy products?

KEEP READING

The next section of our GHP toolbox will be Primary production.
To continue reading, click on the highlighted brick below.



Click here for the next section

FEEDBACK ON THIS GUIDANCE MATERIAL IS ALWAYS WELCOMED!

Please contact us at: food-quality@fao.org

KEEP READING

GHP and HACCP Toolbox for Food Safety
www.fao.org/good-hygiene-practices-haccp-toolbox

FOOD SYSTEMS AND FOOD SAFETY –
ECONOMIC AND SOCIAL DEVELOPMENT
www.fao.org/food-safety

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Food and Agriculture Organization
of the United Nations

INTRODUCTION TO HAZARD ANALYSIS AND CRITICAL CONTROL POINT (HACCP)

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CONTENTS

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CONTEXT

This guidance document is part of a toolbox of materials and has been developed to provide users with a good understanding of food safety management practices, including HACCP systems, based on the Codex General Principles of Food Hygiene (CXC 1-1969).

Hazard analysis critical control points (HACCP) is an important part of food safety management. It is a globally recognized, systematic and science-based approach to food safety that addresses biological, chemical and physical hazards throughout the food chain from primary production to final consumption. The HACCP approach focuses on control measures for significant hazards rather than relying only on end-product inspection and testing. A food business should only implement HACCP once it has established solid prerequisite programmes of food safety management, such as good hygiene practices (GHP).

Implementing HACCP may be challenging for some businesses. However, HACCP principles can be applied with flexibility in individual operations, and businesses may use external resources or adapt a generic HACCP plan to their specific circumstances.

INTRODUCTION TO HAZARD ANALYSIS AND CRITICAL CONTROL POINT (HACCP)

CONTEXT

Learning objectives

This document provides guidance on how to:

- become familiar with the HACCP approach, definitions, 7 principles and 12 steps to implementing HACCP;
- understand the importance of management commitment and an effective GHP programme as foundations for successfully implementing HACCP; and
- understand the benefits and advantages, while recognizing the challenges, of implementing HACCP for some businesses, especially for small and less developed businesses (SLDBs).

CONTEXT

Codex definitions:

Competent authority: The government authority or official body authorized by the government that is responsible for the setting of regulatory food safety requirements and/or for the organization of official controls including enforcement.

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

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.

HACCP system: The development of a HACCP plan and the implementation of the procedures in accordance with that plan.

HACCP plan: Documentation or set of documents, prepared in accordance with the principles of HACCP to ensure control of significant hazards in the food business.

Prerequisite programme: Programmes including Good Hygiene Practices, Good Agricultural Practices and Good Manufacturing Practices, as well as other practices and procedures such as training and traceability, that establish the basic environmental and operating conditions that set the foundation for implementation of a HACCP system.

Good Hygiene Practices (GHP): Fundamental measures and conditions applied at any step within the food chain to provide safe and suitable food.

GENERAL GUIDELINES

HACCP is a management tool for ensuring food safety. It is based on prevention – identifying possible hazards before they occur and defining control measures to maximize food safety at every step of the food production and handling processes.

Some of the main characteristics of HACCP are the following:

- HACCP is a preventive tool that allows food businesses to develop systematic controls of hazards beyond the control achieved through GHP.

- As an internationally recognized tool for controlling food operations, HACCP is promoted by national and regional authorities.

- Food businesses should only implement HACCP once prerequisite or GHP programmes are in place. By adopting HACCP, businesses will be able to further improve their control of hazards and, thus, considerably enhance their confidence in the safety of their final products.

- HACCP has a long track record of successful application in the food industry. In addition, it can be applied throughout the food chain, beginning with primary production.

cont.

GENERAL GUIDELINES

- By implementing a HACCP system, food businesses can identify any changes needed in processing parameters, processing steps, manufacturing technology, end product characteristics, distribution methods, intended use and GHP applied.

- Any HACCP system should be capable of accommodating change, such as advances in equipment design and processing procedures or technological developments.

- The HACCP system has a very structured design and an internationally understood approach and language. This facilitates communication across different processes so that audits follow a standardized procedure based on HACCP plans. As such, communication between food businesses and inspectors or auditors is straightforward, creating opportunities to learn from each other about hazard control.

GENERAL GUIDELINES

Advantages of HACCP

The HACCP system reduces cases of food-borne disease, enhances food safety and provides clear benefits to food businesses such as:

- increasing the efficiency of food production and handling processes by means of a thorough analysis of operations;
- using food safety resources more effectively by focusing on critical areas and reducing expensive and time-consuming end-product inspection and testing;
- reducing recalls by identifying problems before products are released (through an emphasis on prevention), leading to more efficient systems of food safety management;
- reducing the costs of small and less developed businesses (SLDBs) in the medium and long term, through more efficient use of staff, provision of adequate documentation and reduced waste;
- providing a basis for defence against litigation and, potentially reducing insurance costs;
- improving the competitiveness of HACCP-compliant companies on national and international markets;
- facilitating inspection processes by regulatory authorities through documented procedures and monitoring records;
- promoting trade by increasing confidence in food safety; and
- facilitating international trade by promoting science-based targets.

GENERAL GUIDELINES

HACCP is an important part of food safety management

HACCP completes any food safety management system by providing an approach that is:

- systematic
- science-based
- applicable throughout the food chain

The HACCP system and the guidelines for its application are part of the Codex General Principles of Food Hygiene (CXC 1-1969).

GENERAL GUIDELINES

HACCP requires senior management commitment

Successful HACCP implementation requires the commitment and involvement of both senior management and staff. Collecting all relevant information, documenting it and conducting a hazard analysis can best be completed with the involvement of personnel with different expertise and from different departments. Management should support such an approach and provide adequate resources, such as:

- HACCP training sessions
- personnel assigned to the task of developing the HACCP system
- time, during working hours, allotted to developing the HACCP system
- permission for personnel to participate in HACCP meetings

APPLICATION OF HACCP

The seven principles of HACCP

HACCP is flexible and can be implemented in establishments of any size, from the smallest to the largest, by applying the seven HACCP principles. These are:

Principle 1: Conduct a hazard analysis and identify control measures.

Principle 2: Determine the Critical Control Points (CCPs).

Principle 3: Establish validated critical limits.

Principle 4: Establish a system to monitor control of CCPs.

Principle 5: Establish the corrective actions to be taken when monitoring indicates a deviation from a critical limit at a CCP has occurred.

Principle 6: Validate the HACCP plan and then establish procedures for verification to confirm that the HACCP system is working as intended.

Principle 7: Establish documentation concerning all procedures and records appropriate to these principles and their application.

APPLICATION OF HACCP

12-Steps for the application of HACCP

1 Assemble the HACCP team and identify the scope.

2 Describe product.

3 Identify intended use and users.

4 Construct flow diagram.

5 On-site confirmation of flow diagram.

6 List all potential hazards that are likely to occur and associated with each step, conduct a hazard analysis to identify the significant hazards, and consider any measures to control identified hazards (Principle 1).

7 Determine Critical Control Points (CCP) (Principle 2).

8 Establish validated critical limits for each CCP (Principle 3).

9 Establish a monitoring system for each CCP (Principle 4).

10 Establish corrective actions (Principle 5).

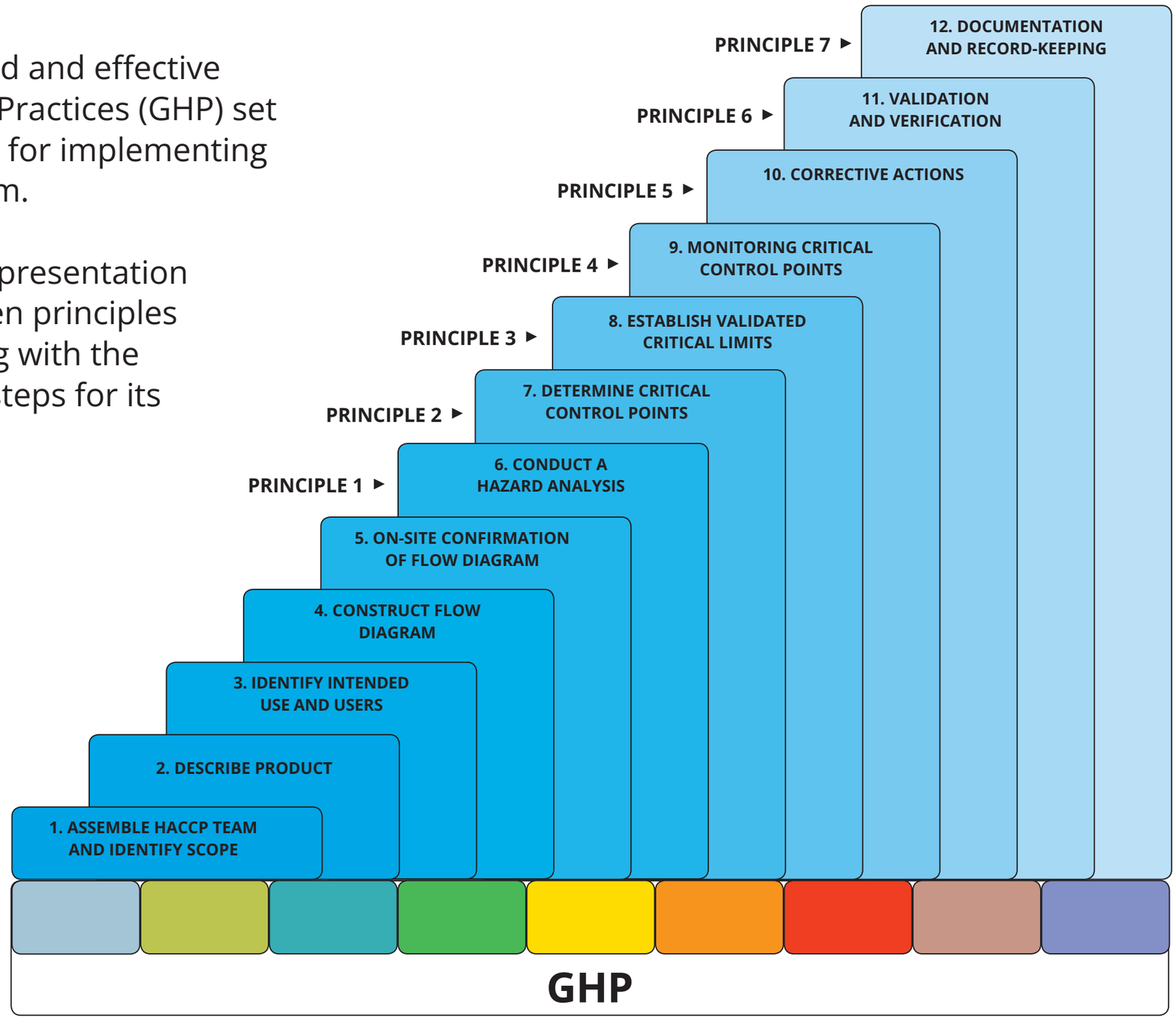
11 Validation of the HACCP Plan and Verification Procedures (Principle 6).

12 Establish documents and record-keeping (Principle 7).

APPLICATION OF HACCP

Well established and effective Good Hygiene Practices (GHP) set the foundation for implementing a HACCP system.

This graphic representation shows the seven principles of HACCP along with the 12 successive steps for its application.



APPLICATION OF HACCP

Prerequisite programmes

Before applying HACCP principles, food businesses should have well-established prerequisite programmes, including GHP, to ensure basic environmental and operational conditions.

These prerequisite programmes, if implemented effectively, will provide a foundation and facilitate the successful application and implementation of the HACCP system. HACCP application will not be effective without prior implementation of prerequisite programmes.

The lack or inadequate implementation of prerequisite programmes may lead to more complex HACCP plans, with a greater number of Critical Control Points (CCPs) to be monitored due to the inclusion of hygiene aspects. More CCPs means increased difficulty in managing the plan, which may reduce its efficacy in ensuring food safety.

APPLICATION OF HACCP

Developing a preventive approach to food safety

Food producers must be confident about the safety of each product that leaves their production site. While a reactive system of end-product testing cannot provide such assurance, the application of HACCP provides an enhanced level of systematic controls that can provide reliable assurance of the safety of end products. The HACCP system involves:

- focusing on the control of specific hazards at CCPs; and
- applying targeted, proactive interventions before and during food production or handling processes at CCPs to control any risks.

APPLICATION OF HACCP

Facilitating HACCP implementation

Depending on the circumstances and capabilities of the food business, some resources can facilitate HACCP implementation. Additionally, in some cases, a more flexible approach to the application of HACCP may be needed and might be accepted by competent authorities.

Food businesses further can contract external consultants to support their HACCP implementation or consult generic HACCP plans. However, it should be noted that generic plans have to be adapted to individual operations. (These plans are often available through competent authorities, academia and industry and trade associations.)

The following external resources can facilitate HACCP implementation:

- Agrifood sector businesses involved in all stages of the supply chain and involved in continuous problem solving and prevention (rather than relying solely on periodic facility inspections by regulatory agencies).

- Government authorities provide appropriate legislation and policies that promote and enhance the adoption and implementation of HACCP principles.

- Academia, including training and research institutions provide science-based data, train HACCP experts and support businesses in their implementation of HACCP systems.

APPLICATION OF HACCP

HACCP implementation offers some flexibility for small and less developed bussiness (SLBDs) with limited resources:

- HACCP-based systems can be developed which are consistent with the seven HACCP principles but do not apply all the steps of the HACCP system.

- HACCP-based systems that involve recording only the monitoring results that show a deviation, rather than recording all monitoring results, thus reducing unnecessary record-keeping.

Such flexible systems should be designed considering the nature of the food operation, including human and financial resources, infrastructure, processes, knowledge and practical constraints, as well as risks associated with the food produced. These adaptations must not negatively impact the efficacy of the HACCP system nor endanger food safety.

APPLICATION OF HACCP

Challenges and benefits in HACCP implementation

Small and less developed businesses (SLDBs) might require support. In many countries a large share of the food sector comprises businesses that encounter difficulties in implementing HACCP because of their small size, lack of technical expertise and economic resources, or due to the nature of their work. These businesses are referred to as a small and less developed businesses (SLDBs).

SLDBs supply their products to both exporting businesses and local markets. Therefore, for both economic and public health reasons, governments and larger companies have an interest in helping SLDBs to adopt internationally recognised food safety management systems that comply with the Codex General Principles of Food Hygiene.

APPLICATION OF HACCP

Understanding the obstacles to applying HACCP

Despite its many benefits HACCP is still mostly applied in large companies.

In SDLBs, HACCP is less widespread due to:

- the cost of infrastructure and of upgrading facilities;
- lack of recognition that HACCP is a means to increase efficiency in controlling food safety;
- the very limited resources of small companies;
- the lack of valid data in certain food industries for developing sound HACCP models;
- limited experience with HACCP in certain sectors; and
- the lack of guidance material to help industries take the first steps towards developing a HACCP model.

APPLICATION OF HACCP

Support is available for helping SLDBs adopt HAACP

Different approaches to addressing the barriers SLDBs face in their attempts to implement HACCP are being tried and tested around the world. A number of strategic activities to facilitate HACCP implementation by SLDBs include overall support activities (such as financial support, guidance materials and training) and adapted regulatory requirements that allow for flexible, HACCP-based approaches to food safety management. This allows SLDBs to develop systems that fit their requirements and resources.

See **Further reading** for additional information on HACCP and the implementation of a HACCP system.

THE HISTORY OF HACCP

HACCP origins

- The HACCP concept originated in the 1960s, when the Pillsbury Company, NASA and the US Army developed a system to ensure the microbiological safety of foods for space travel.
- Over the next 50 years, the food industry increasingly adopted HACCP, recognizing its usefulness for moving away from end-product testing to a proactive, preventive food safety control system.
- Motivated to improve food safety, many large trading blocs now require national and exporting food businesses to have in place food management systems that apply HACCP principles.
- Over the years, governments and food businesses have gained a wealth of experience in the application of GHP/HACCP and many lessons have been learned.

THE HISTORY OF HACCP

Main HACCP milestones

- **1971:** The HACCP concept is publicly presented at the National Conference on Food Protection.
- **1972:** For the first time, HACCP is used to educate other food facilities in the industry, through a course entitled, Food Safety through the Hazard Analysis and Critical Control Point System – a training programme for inspectors of the Food and Drug Administration (FDA) of the United States of America for inspecting canned foods.
- **1974:** The FDA applies HACCP principles in promulgating low-acid canned foods to eliminate incidences of botulism.
- **1980s:** The HACCP approach is adopted by major food companies.
- **1991:** The National Advisory Committee on Microbiological Criteria for Foods of the United States Department of Agriculture (USDA) publishes a report setting forth the basic principles of the system as they are known today.
- **1993:** Guidelines for applying HACCP are adopted by the 20th session of the Codex Alimentarius Commission.
- **2003:** FAO and WHO are appointed to develop HACCP guidelines for SLDBs, highlighting potential obstacles and approaches to overcome them.
- **2020:** The Codex General Principles of Food Hygiene are revised and HACCP is included as an integral part of the text.

THE HISTORY OF HACCP

Current status of HACCP

Today, the use of systematic approaches of food hazard control, such as HACCP in combination with strong GHP, is considered to be the most effective and efficient way to ensure food safety. Many countries have recognized the necessity of such proactive, science-based food regulatory systems to reduce the risk of food-borne illness. The process-oriented food business sector, in particular, has made the greatest progress in HACCP adoption.

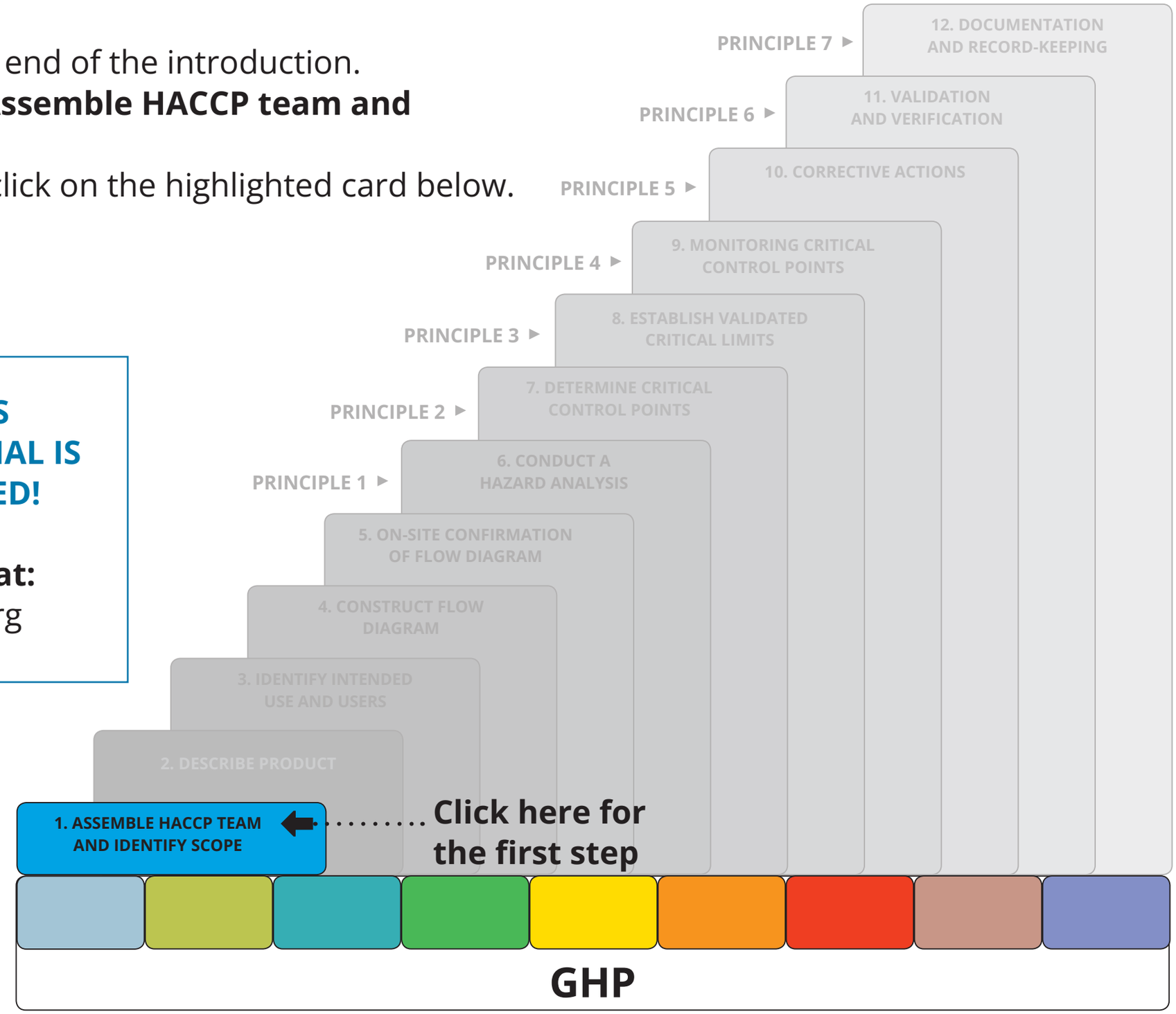
Despite the global recognition of the usefulness of HACCP, SLDBs continue to face considerable obstacles to develop fully documented HACCP system. Competent authorities acknowledge this, and flexible approaches to the implementation of HACCP are available and encouraged.

KEEP READING

You have reached the end of the introduction.
The first step will be **Assemble HACCP team and identify scope**.
To continue reading, click on the highlighted card below.

FEEDBACK ON THIS GUIDANCE MATERIAL IS ALWAYS WELCOMED!

Please contact us at:
food-quality@fao.org



KEEP READING

GHP and HACCP Toolbox for Food Safety
www.fao.org/good-hygiene-practices-haccp-toolbox

FOOD SYSTEMS AND FOOD SAFETY –
ECONOMIC AND SOCIAL DEVELOPMENT
www.fao.org/food-safety

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
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