



Food and Agriculture Organization
of the United Nations

GHP – SECTION 5

ESTABLISHMENT MAINTENANCE, DISINFECTION AND PEST CONTROL

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

GHP – SECTION 5

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MAINTENANCE,
DISINFECTION
AND PEST CONTROL**

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Hazard Analysis and Critical Control Point
(HACCP) Toolbox for Food Safety

Food and Agriculture Organization of the United Nations
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Technical note for readers

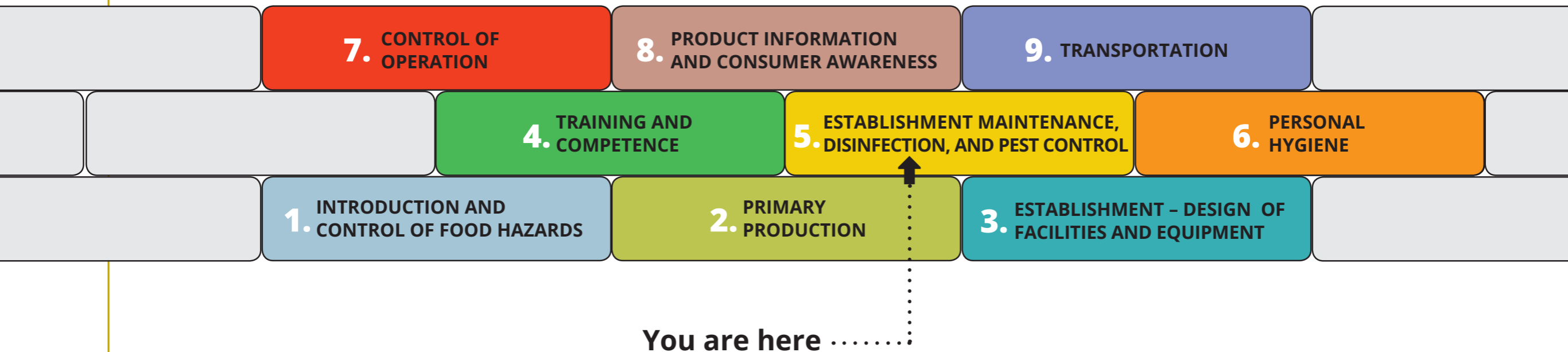
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SCOPE AND INSTRUCTIONS FOR USE

This guidance document is part of a toolbox of materials and has been developed to provide users with a good understanding of Section 5, Establishment maintenance, disinfection and pest control 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.



CONTEXT

To produce safe food, a food establishment requires appropriate maintenance, cleaning and disinfection, pest control and waste management programmes and procedures. These programmes must be effective for controlling food contaminants and pests, which can compromise food safety.

Rationale

To facilitate the continuing effective control of food contaminants, pests, and other agents likely to compromise food safety and suitability.

Learning objectives

This document covers the topics of maintenance, cleaning and disinfection, and pest control for food businesses and provides guidance on how to develop, implement and monitor programmes:

- of effective maintenance for the establishment and the equipment so that they function as intended, can be easily cleaned and disinfected and do not compromise food safety;
- of effective cleaning and disinfection that meets food processing requirements using the appropriate cleaning procedures and ensure the programme is carried out on a regular schedule; and
- of effective pest control and waste management to control the presence of pests and prevent food contamination.

CONTEXT

Codex definitions

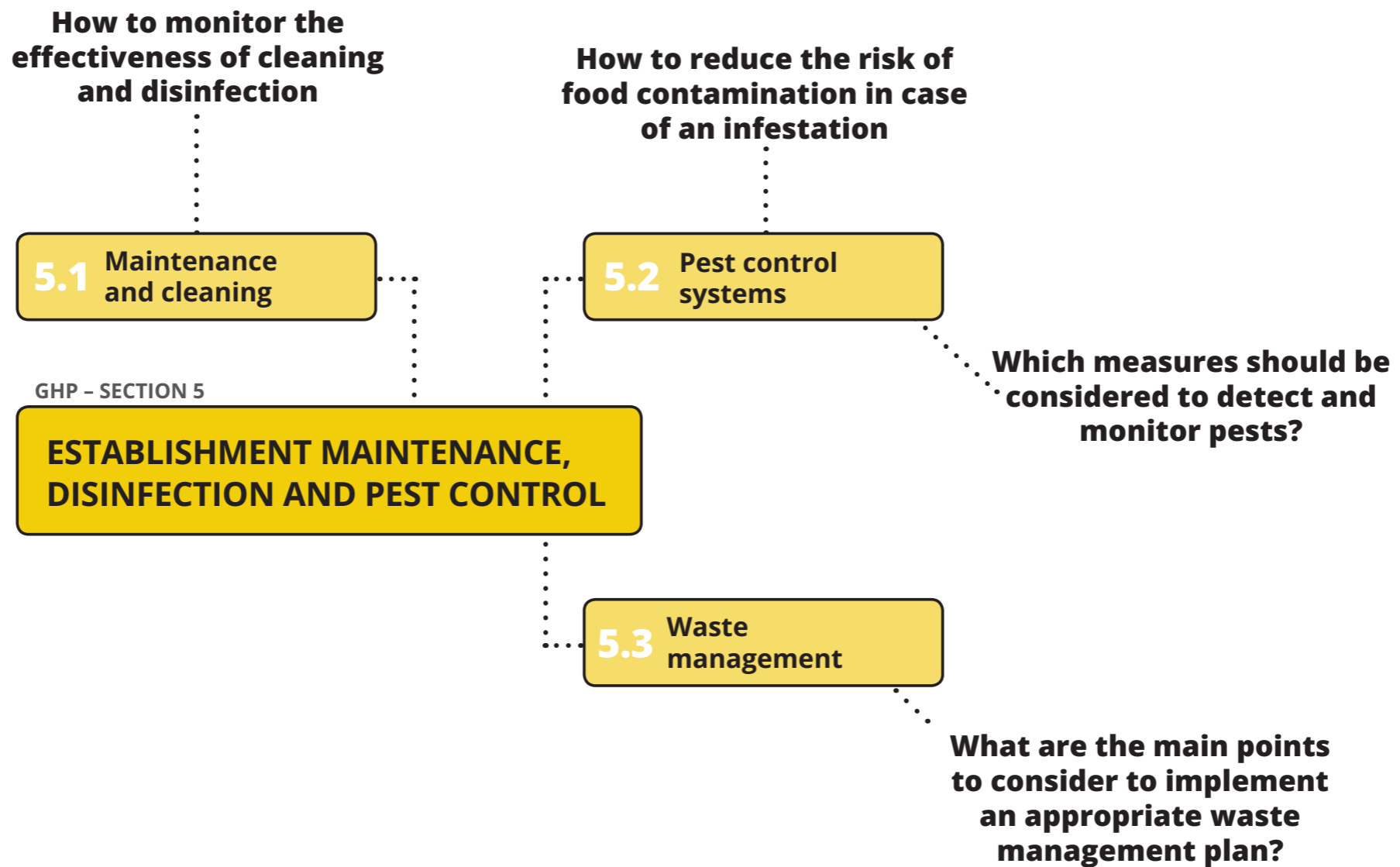
Cleaning: The removal of soil, food residues, dirt, grease or other objectionable matter.

Disinfection: Reduction by means of biological or chemical agents and/or physical methods in the number of viable microorganisms on surfaces, in water or air to a level that does not compromise food safety and/or suitability.



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



5.1 MAINTENANCE AND CLEANING

Maintenance of the establishment, facilities and equipment ensures that the establishment, facilities and the equipment function as intended (e.g. refrigeration units maintain a low temperature; screens on windows prevent pests from entering facilities; toilet facilities are hygienic; etc.) and that cleaning and disinfection procedures are effective, thus contributing to the control of biological, chemical and physical hazards.

An effective maintenance programme will employ trained personnel who are provided with the tools to perform the task. Preventative maintenance should be performed on a pre-determined schedule. For equipment and certain facilities (e.g. water treatment) the maintenance requirements could be suggested by the manufacturer.



Maintenance should also be performed as required and when required. **All maintenance should be documented** so that it can be reviewed and the information linked to food safety incidents and the maintenance plan can be improved.

5.1 MAINTENANCE AND CLEANING



Things to consider

- A poorly maintained facility can be a source of food contamination (i.e. cracks in floors, pooling water and condensation create sites where microorganisms can grow, while peeling paint, broken ceiling tiles and improperly stored cleaning chemicals can contaminate food).
- Poorly maintained equipment can result in processing temperatures not being reached or maintained and can increase the risk of metal/plastic shards from blades being transferred to the product.
- An establishment and equipment that are properly maintained are also usually easy to clean and disinfect.

5.1 MAINTENANCE AND CLEANING

Preventative maintenance

Maintenance should be performed regularly to ensure that equipment is functioning as intended and to prevent contamination of the food (e.g. excessive vibrations could cause equipment to lose screws, worn gaskets could affect heat transfer). Implementing a preventative maintenance routine will contribute to the production of food safe.



Things to consider

- Proper maintenance plans should be implemented in establishments to avoid contamination from damaged walls, floors, ceiling, doors, or windows.
- Establishments and equipment should be inspected on a pre-determined schedule and measures should be taken in case of deterioration.
- Performing maintenance inside food production areas could cause contamination. Measures must be implemented to keep food safe during maintenance, or, when possible, remove the equipment from food production areas to perform the maintenance.
- Clean and disinfect equipment carefully after maintenance. If the equipment was repaired outside food processing areas, it should be cleaned and disinfected before being introduced to the food processing areas to avoid bringing in contamination.
- Avoid non-food grade lubricants in areas that will be in contact with food.

5.1 MAINTENANCE AND CLEANING

Maintenance frequency

Maintenance should be performed at the appropriate frequency, considering:

- manufacturer's instructions;
- results from previous equipment/establishment inspections; and
- failures in operations.

5.1 MAINTENANCE AND CLEANING

Cleaning and disinfecting

It is important to differentiate between cleaning and disinfection. Cleaning removes debris but does not inactivate microorganisms. In contrast, disinfection inactivates the microorganisms that could contaminate the product.

A cleaning procedure should remove debris (visible or invisible) from the surface to prevent microorganisms from growing. It further is important to ensure that disinfection is only carried out once debris has been removed to ensure that sanitizers are effective. Cleaning uses detergents should be selected based on the nature of the residue and debris, and sanitizer should only be used if there is need to eliminate the presence of a biological hazard that could not be removed by the cleaning step. Food business operators have to ensure that disinfectants target biological hazards of significance to their food and operations and also ensure that the disinfectants are used in the correct concentrations and applied for as long as required to achieve the desired effect.

Cleaning is performed on all surfaces (equipment and facility), but disinfection is most important for food contact surfaces.

Similarly, it should be noted that equipment used for sanitation (brushes, mops, shovels) can transfer contamination from low-risk areas (e.g. receiving areas) to high risk (finished product) areas. It therefore is considered good practice to have cleaning equipment reserved for a particular hygiene zone.

5.1 MAINTENANCE AND CLEANING



Things to consider

- Chemical residues from cleaning and disinfection products can contaminate the food product, if not used appropriately.
- When appropriate, equipment should be disassembled so that it can be sufficiently cleaned and disinfected.
- The choice of cleaning product (detergent) and concentration depend on the nature of the soil to be cleaned, and the choice of sanitizer depends on the target organisms. Reputable suppliers of cleaning and disinfecting chemicals should provide guidance on the optimal use of their products towards a desired outcome.
- All detergent and sanitizer should be used in accordance with the manufacture's recommendations (e.g. concentration, temperature, contact times) and should comply with local regulations.
- The sequence of cleaning and disinfection activities should be documented.

cont.

5.1 MAINTENANCE AND CLEANING



Things to consider

- Cleaning and disinfection utensils should be stored away from foodstuffs to prevent contamination.
- Cleaning and disinfection should be done after all food production in the area is done, or in a separate area to avoid the spread of contaminants through splashes and aerosols.
- Brushes, cloths and pads used for cleaning and disinfecting can become contaminated and must be disinfected and replaced, as needed.

5.1 MAINTENANCE AND CLEANING

Cleaning

- ➔ The cleaning process depends on the effective application of chemicals, contact time, physical methods (pressure, brushing, scrubbing etc.) and temperature. Depending on the nature of the debris to be removed and the food processing operation, a different combination of these four elements should be selected.

The dry cleaning process consist of removing waste by applying the physical methods such as brushing, wiping, pressurized air, etc. These methods of cleaning are suitable for food processing areas where water could be a source of contamination or where processing of dry foods is undertaken or where equipment would rust. Disinfectants appropriate for dry cleaning processes, such as alcohol-based sanitizers, would need to be selected.

The wet cleaning process is carried out using water and detergents. Since the residue solubility depends on many factors, it is necessary to choose chemicals that are suitable for the types of residues to be cleaned. It is necessary to rinse to remove chemical residues after detergents have been applied. Finally drying, to prevent the growth of fungi, should be performed with clean air or clean cloths, and air drying of clean equipment should be done on racks with sufficient air circulation.

5.1 MAINTENANCE AND CLEANING

Disinfection

Disinfection will reduce/eliminate biological contamination that cannot be done by cleaning alone. It should be performed after the cleaning step and cannot replace the cleaning step, otherwise residues could affect the efficacy of disinfectants. Disinfection could be physical by applying heat, ultraviolet light, pressure, etc. or chemical by applying chlorine, ethanol, ozone, etc.

Not all chemicals are approved for use in food production areas.

5.1 MAINTENANCE AND CLEANING

Sanitation programme

Food processors should establish a sanitation programme to ensure that the entire establishment and all equipment are cleaned regularly. They should select cleaning and disinfectant methods that are suitable for the particular establishment, equipment, food and contaminants. These methods should be standardized and established with frequency appropriate to the risk of food contamination.

Sanitation Standard Operating Procedures (SSOP) should be in writing and should explain the method of cleaning, provide details for the cleaning procedure, specifying the facilities and equipment to be cleaned, provide instruction for disassembling and reassembling when required along with the frequency of the procedure. Personnel in charge of SSOP should be trained and training records kept. SSOP should be validated before being implemented to ensure its effectiveness.

Sanitation operations should be performed in an organized manner to prevent the contamination of foods and/or rooms and equipment that have already been cleaned.



A documented sanitation programme will help those responsible for cleaning consistently do their job well, and it will help with the training of new personnel.

5.1 MAINTENANCE AND CLEANING

Monitoring sanitation programmes

The effectiveness of cleaning operations must be regularly controlled. Visual inspections, audits, measuring important parameters such as pH, temperature, and chemical contact times are examples of verifying that the SSOPs are performed as intended. In some cases, sampling and performing microbiological tests could also be useful to monitor the effectiveness of the disinfection procedures.

Supervisor should verify, among other things, that:

- personnel are properly trained;
 - procedures are properly followed and at the appropriate frequency;
 - personnel are applying the correct chemicals in the correct concentration;
 - utensils are in good condition and working order;
 - water or air quality is adequate for sanitation purposes; and
 - personnel are keeping accurate records.
- ➔ Reviewing and maintaining monitoring records helps food processors identify problem areas before deviations happen. Once problem areas are identified they should be corrected in a way to avoid them being repeated.

5.1 MAINTENANCE AND CLEANING

FBO RESPONSIBILITIES



Topic

Examples of what you should do

Maintenance

Implement preventive maintenance and perform it at a frequency recommended by the manufacturer and/or necessary to maintain a processing environment that minimizes the risk of food safety hazards. Keep records and adjust the frequency of maintenance when necessary.

Cleaning and disinfection

Implement a suitable sanitation programme for the establishment and equipment considering appropriate sanitation, methods, chemicals, utensils and frequencies to maintain food safety.

Monitoring effectiveness

Document the efficacy of the previous sanitation procedures. Verify and validate suggested procedures and chemicals for the appropriate sanitation.

5.2 PEST CONTROL SYSTEMS

It is important that food processors implement pest prevention and pest control systems in food businesses to avoid infestation. They should consider all types of pests that could have access to food processing areas, such as birds, rodents, insects, etc.

Pest prevention

Pesticides are hazardous chemical contaminants for food and should be carefully managed. Different methods of prevention should be implemented to reduce the probability of infestations and reduce the need to use these chemicals.

The design and layout of the establishment could promote pest infestations. For example, insects or rodents can hide in holes in walls, birds can build nests in the horizontal surfaces in roofs structures, and insects can also hide in the spaces behind machines.

5.2 PEST CONTROL SYSTEMS

➔ **Create barriers outside to prevent pests from entering the establishment.**

- Place fences or walls around the establishment to keep animals away.
- Set traps around the perimeter, when necessary.
- Do not allow water to accumulate outside the establishment (e.g breeding ground for mosquitoes).
- Install mesh and screens on windows.
- Ensure that doors and windows are in good condition and can be closed properly.
- Avoid open space between doors and floors.
- Train personnel to close doors after entering the establishment or install self-closing doors.
- Remove unused materials or equipment.

5.2 PEST CONTROL SYSTEMS

Pest harbouring and infestation

To avoid pest infestations, the food producer must create an environment inside the establishment that is not attractive to pests:

- Keep warehouses clean and organized.
- Store food in pest-proof containers and keep them closed to avoid contamination.
- Keep stored food items or materials away from the floors, walls or ceilings.
- Consider using double packaging when necessary so that the external package can be removed before introducing materials/ingredients into food processing areas.
- Keep areas clean and free of waste.
- Refuse incoming materials if the packaging is in poor condition.
- Keep waste receptacles closed to avoid attracting pests.

5.2 PEST CONTROL SYSTEMS

Monitoring and detecting pests

Pest can hide easily and create breeding sites without being noticed; therefore, it is important to monitor for infestations. Consider establishing Traps and detectors to help monitor and detect pest before they become a food safety issue according to the following factors:

- Establish detection methods in surrounding areas or in places that will not affect food safety.
- Verify with a establish frequency presence of pest in traps and keep records.
- Check bait stations to see a pest might consume something.
- Implement measures in case of detection.

5.2 PEST CONTROL SYSTEMS

Controlling pest infestations

It is important to implement corrective action as soon as an infestation is detected. The personnel in charge of pest control may need to apply specialized pest control treatments which go beyond the usual sanitation protocols. These personnel should receive special training to be able to apply these pest elimination treatments without affecting their safety or the safety of the food. Personnel must:

- follow the manufacturer's instructions for preparing and applying a pesticide;
- apply pesticides away from food and food contact surfaces such as equipment, tools or packaging;
- store pesticides away from food and food contact surfaces;
- do not reuse the container for pesticides and discard it safely;
- do not apply pesticides in food processing areas or food storage areas and take measures to avoid food contamination; and
- It might be necessary to hire the services of a specialized pest control provider.

Monitor the effectiveness of the procedure and keep records in order to take measures that could help to prevent future infestations.

5.2 PEST CONTROL SYSTEMS

FBO RESPONSIBILITIES



Topic	Examples of what you should do
Pest prevention	Document the pest control programme. This should include measures taken within and outside the facility to prevent pests.
Pest harbouring and infestation	Implement measures to avoid harbouring pests that could cause an infestation.
Monitoring and detection	Document previous incidents with pests and use baits and traps to verify that there are no pests in the area.
Controlling a pest infestation	Take adequate and immediate corrective actions to prevent food from being contaminated with pests or pesticides.

5.3 WASTE MANAGEMENT

Waste inside food processing areas or food storages areas could contaminate foods. Waste can attract different pests to food processing areas. Therefore, it is important to manage waste carefully.

The personnel in charge of removing waste should be trained to avoid contamination of foods. They should know to:

- avoid contact with other employees, clean cloths, equipment and materials;
- try to remove waste at the end of the shift to avoid returning to the food processing areas;
- avoid contact between clean cloths and waste if they need to return to the food areas; and
- wash their hands after removing waste from the establishment or after having contact with waste.

5.3 WASTE MANAGEMENT



Things to consider

- Waste should not be allowed to accumulate inside food areas.
- Waste movement should go from clean areas to dirty areas.
- Waste containers should be in good condition, have lids and be included in the sanitation plan.
- Waste should be stored and collected far away food processing and food storage areas.
- Personnel from clean areas should not go to waste accumulation areas.
- Waste collection areas should be kept clean.
- Measures should be taken to keep animals and pests away from waste collection areas.
- Measures should be taken to prevent contamination from air that flows from waste collecting areas.

5.3 WASTE MANAGEMENT

FBO RESPONSIBILITIES



Topic

Examples of what you should do

Waste management

Keep waste away from food processing areas and in appropriate containers. Follow the guidance for waste management or the instructions for using landfills or water treatment services provided by the municipal council and other regulators.



IN SUMMARY

Element	Hazard category	Examples of hazards to consider
Processing environment and equipment	biological	pathogens, biofilms
	chemical	allergens, lubricants, chemical residues
	physical	plaster, metal, plastic, wire, paper
Pests	biological	pathogens and parasites
	chemical	urine
	physical	droppings, hair, carcass
Waste	biological	pathogens
	chemical	lubricants, chemicals for cleaning and disinfection
	physical	metal debris, screws, wood, plastic, glass, paper

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](#).

How should a food facility be cleaned and sanitized?

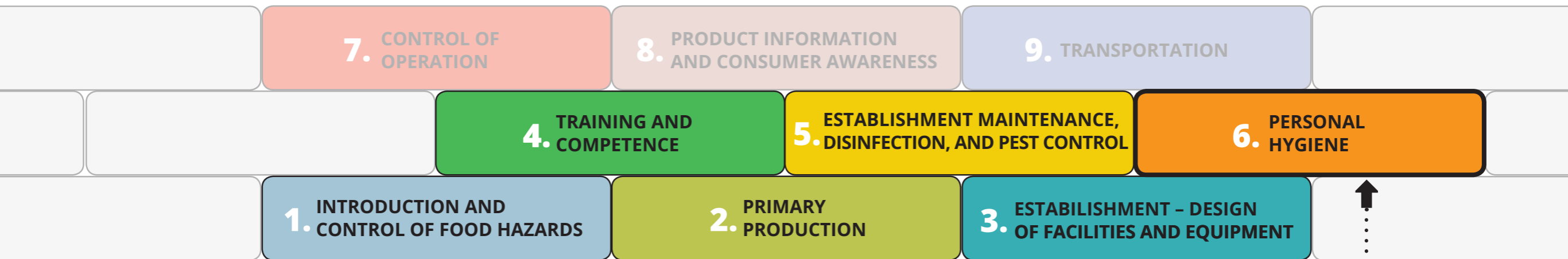
Why is sanitation important after maintenance in food facilities?

What strategies could be useful for pest control in a food facility?

Which rules should be followed for correct disposal of waste?

KEEP READING

The next section of the GHP toolbox is Personal Hygiene.
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

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