
**Prerequisite programmes on food
safety —**

**Part 3:
Farming**

*Programmes prérequis pour la sécurité des denrées alimentaires —
Partie 3: Agriculture*



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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

In other circumstances, particularly when there is an urgent market requirement for such documents, a technical committee may decide to publish other types of document:

- an ISO Publicly Available Specification (ISO/PAS) represents an agreement between technical experts in an ISO working group and is accepted for publication if it is approved by more than 50 % of the members of the parent committee casting a vote;
- an ISO Technical Specification (ISO/TS) represents an agreement between the members of a technical committee and is accepted for publication if it is approved by 2/3 of the members of the committee casting a vote.

An ISO/PAS or ISO/TS is reviewed after three years in order to decide whether it will be confirmed for a further three years, revised to become an International Standard, or withdrawn. If the ISO/PAS or ISO/TS is confirmed, it is reviewed again after a further three years, at which time it must either be transformed into an International Standard or be withdrawn.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO/TS 22002-3 was prepared by Technical Committee ISO/TC 34, *Food products*, Subcommittee SC 17, *Management systems for food safety*.

ISO/TS 22002 consists of the following parts, under the general title *Prerequisite programmes on food safety*:

- *Part 1: Food manufacturing*
- *Part 3: Farming*

The following part is under preparation:

- *Part 2: Catering*

Introduction

Food and feed safety has to be ensured at all stages of the food chain. Operators have the responsibility to ensure that the production, processing and distribution of foodstuffs meet hygiene requirements.

In the same way, farmers (organizations) have to implement food safety control measures relevant to the required safety of their end-products. This applies to all farm end-products, but the required safety may depend on the intended use, such as whether they are intended to be processed, and on whether hazards can be controlled later in the food chain. Farmers (organizations) will be able to justify and implement these control measures, and when necessary carry out records, ensure upstream and downstream traceability, maintain documents related to incoming materials and even sometimes carry out sampling for analyses.

The farmers (organizations) are required to comply with local regulation including general and specific hygiene rules, which include good hygiene programmes. Where no such regulation exists, it is often the case that Codex standards or the regulation of the country of sales apply.

Today, food safety control measures at farms are typically integrated into good practices [e.g. good agricultural practices (GAP), good farming practices (GFP), good veterinary practices (GVP), good hygienic practices (GHP)]. GAP and GFP can address environmental, economic and social sustainability for on-farm processes, resulting in safe and qualitative food and non-food agricultural products. GHP address the conditions and measures necessary to ensure the safety and suitability of feed or food at all stages of the food chain. GVP address the appropriate use of veterinary drugs or feed additives, in accordance with the authorized use, in terms of dosage, applications and withholding periods, to obtain adequate treatment of animals while leaving as little residue as possible in food derived from the animals. These practices aim at contaminants in general, whether they affect safety, suitability or both. They are generally not oriented towards specific hazards.

The roles and responsibilities of the Codex Alimentarius Commission (CAC) and the World Organisation for Animal Health (OIE) are to set international standards that are the basis for safe international trade under the World Trade Organization Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement). The OIE establishes official standards for animal health (including on farm measures for food safety) and health certification and the CAC establishes official standards for food safety and labelling.

ISO 22000 specifies food safety requirements for organizations in the food chain willing to meet them. One such requirement is that organizations establish, implement, and maintain prerequisite programmes (PRPs) to assist in controlling food safety hazards (ISO 22000:2005, 7.2). PRPs are the basic conditions and activities that are necessary to maintain a hygienic environment throughout the food chain suitable for the production, handling and provision of safe end-products and safe food for human consumption.

When a farm moves from a GHP-based system to an ISO 22000-based system, a hazard analysis is required when it is missing. Then, most of the GHPs are likely to continue as PRPs. If the hazard analysis concludes that there are hazards that need to be controlled by targeted measures, others may be categorized as operational prerequisite programs (oPRPs).

This part of ISO 22002 does not duplicate the requirements given in ISO 22000 and is intended to be used when establishing, implementing and maintaining the PRPs specific to the organization(s), in accordance with ISO 22000. This part of ISO 22002 is not intended for certification purposes.

In practical terms, the following applications of this part of ISO 22002, in accordance with ISO 22000, are possible.

- a) An organization developing the PRPs part of codes of practice, or checking that an existing code of practice is consistent with this part of ISO 22002.
- b) A group of farmers establishing a common ISO 22000 food safety management system. Based on the hazards analysis, the group determines the control measures to be implemented by each member. It is intended that the group of farmers will use this part of ISO 22002 as a basis to structure and document the PRPs corresponding to the activity of the farms. If certification is desired, the certificate can be granted to the group of farmers and not to the individual members.

- c) One or more organizations establishing an integrated ISO 22000 food safety management system covering both farming and processing. Based on the hazards analysis, the organization(s) determine(s) the control measures to be implemented at the farming and processing levels. PRPs applicable to the farms will be selected and implemented on the basis of this part of ISO 22002. PRPs applicable to the processing establishment(s) will be selected and implemented on the basis of the ISO/TS 22002-1. If certification is desired, one certificate can be granted to the integrated system.
- d) A farmer implementing an ISO 22000 food safety management system. Based on the hazards analysis, the farmer determines the control measures to be implemented. The farmer will use this part of ISO 22002 as a basis to structure and document the PRPs corresponding to the activity of the farm. If certification is desired, the certificate can be granted to the farmer.

Each subclause specifying guidelines for the selection of PRPs within Clauses 5, 6 and 7, starts with a paragraph introducing the objective as regards food safety. It is followed in the next paragraphs by general requirements ("shall" wording) for maintaining a hygienic environment within primary production. Further, itemized examples of potentially applicable PRPs intended to comply with those requirements are recommended ("should" wording). The final paragraphs of each subclause describe the documentation, including records, which are required or recommended, as well as the actions to implement when applicable requirements are no longer met.

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Prerequisite programmes on food safety —

Part 3: Farming

1 Scope

This part of ISO 22002 specifies requirements and guidelines for the design, implementation, and documentation of prerequisite programmes (PRPs) that maintain a hygienic environment and assist in controlling food safety hazards in the food chain.

NOTE 1 The last paragraph of the introduction provides information for a correct understanding of the normative or guidance character of the subclauses within Clauses 5, 6 and 7 of this part of ISO 22002.

This part of ISO 22002 is applicable to all organizations (including individual farms or groups of farms), regardless of size or complexity, which are involved in farming steps of the food chain and wish to implement PRPs in accordance with ISO 22000:2005, 7.2. If an organization is using this part of ISO 22002 as a reference for the purpose of making a self-declaration of conformity with or seeking certification to ISO 22000:2005, deviations therefrom (i.e. where exclusions are made or alternative measures are implemented) need to be justified and documented. It is expected that such deviations will not affect the ability of the organization to comply with the requirements of ISO 22000.

This part of ISO 22002 is applicable to the farming of crops (e.g. cereals, fruits, vegetables), living farm animals (e.g. cattle, poultry, pigs, fish) and the handling of their products (e.g. milk, eggs). It is not applicable to activities such as picking of wild fruits, vegetables and mushrooms, fishing, hunting, which are not considered as organized farming activities.

All operations related to farming are included in the scope (e.g. sorting, cleaning, packing of unprocessed products, on-farm feed manufacturing, transport within the farm). However, this part of ISO 22002 is not applicable to processing activities carried out on farm premises (e.g. heating, smoking, curing, maturing, fermenting, drying, marinating, extraction, extrusion or a combination of those processes). Neither is this part of ISO 22002 applicable to products or animals that are being transported to or from the farm.

NOTE 2 Guidance on PRPs for operations further down the food chain will be covered, if necessary, by other parts of ISO 22002, as is done by ISO/TS 22002-1 for manufacturing.

Farming operations are diverse in nature according to size, type of products, production methods, geographical and biological environment, related statutory and regulatory requirements etc. Therefore, the need, intensity and nature of PRPs will differ between organizations. Established PRPs can also change as the result of the review procedures stated in ISO 22000:2005, 8.2. This part of ISO 22002 focuses on the requirements for the management of PRPs, while the design of the exact PRPs is left to the user. The management of PRPs includes assessment of the need, selection of measures that meet the identified needs and required records. The specific examples of PRPs listed in this part of ISO 22002 are intended for guidance only, and are aimed for application with due regard to the overall objective of producing food which is safe and suitable for consumption.

It is possible for this part of ISO 22002 to be applied by other organizations willing to develop codes of practice and other types of supplier-buyer relationship based on ISO 22000.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 22000:2005, *Food safety management systems — Requirements for any organization in the food chain*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 22000 and the following apply.

3.1

clean water

water that does not compromise food safety in circumstances of its use

NOTE 1 Adapted from CAC/RCP 53-2003^[4].

NOTE 2 In the context of this part of ISO 22002, the term refers to natural or purified water that does not contain microorganisms, harmful substances in quantities capable of directly or indirectly affecting the safety of food.

3.2

competent person

person, qualified by knowledge and practical experience, with the necessary skills and ability to perform an assigned task

NOTE Education, training or experience is how a person achieves competency.

3.3

contamination

introduction or occurrence of a contaminant in food, feed or in food and feed environment

NOTE Adapted from CAC/RCP 1-1969^[3].

3.4

contaminant

any biological or chemical agent, foreign matter or other substances not intentionally added to food or feed which may compromise food safety

NOTE 1 Adapted from CAC/RCP 1-1969^[3].

NOTE 2 In the context of this part of ISO 22002, the term “foreign matter” refers to physical contaminants.

NOTE 3 This definition is similar to the definition of “food safety hazard” given in ISO 22000:2005, 3.3. In fact, in the context of ISO 22000:2005, food safety hazards are identified during the hazard analysis, after the establishment of PRPs. Consequently, the term “contaminant” is used in this part of ISO 22002.

3.5

feed

any single or multiple materials, whether processed, semi-processed or raw, which is intended to be fed directly to food-producing animals

NOTE Adapted from CAC/RCP 54-2004^[8].

3.6

feed additive

any intentionally added ingredient not normally consumed as feed by itself, whether or not it has nutritional value, which affects the characteristics of feed or animal products

NOTE Adapted from CAC/RCP 54-2004^[8].

3.7

feed ingredient

component part or constituent of any combination or mixture making up a feed, whether or not it has a nutritional value in the animal's diet, including feed additives

NOTE 1 Ingredients are of plant or animal origin, whether terrestrial or aquatic, or other organic or inorganic substances.

NOTE 2 Adapted from CAC/RCP 54-2004^[8].

3.8**lot**

set of units of a product which have been produced or processed or packaged under similar circumstances

NOTE 1 Adapted from ISO 22005:2007^[2].

NOTE 2 The lot is determined by parameters established beforehand by the organization.

NOTE 3 A set of units can include a single unit of product.

3.9**medicated feed**

any feed which contains **veterinary drugs** (3.15)

NOTE Adapted from CAC/RCP 54-2004^[8].

3.10**organization**

group of people and facilities with an arrangement of responsibilities, authorities and relationships

EXAMPLE Company, corporation, firm, enterprise, institution, charity, sole trader, association, or parts or combination thereof.

[ISO 9000:2005^[1], 3.1.1]

NOTE In the context of this part of ISO 22002, the term refers to a farmer, a group of farmers, farming company or an association, an authority or a processing company establishing PRPs for farmers. An organization can be public or private.

3.11**packaging**

any product to be used for containment, protection, handling, delivery, storage, transport and presentation of agricultural products or foods

NOTE 1 Adapted from BSI/PAS 223^[14].

EXAMPLE Wraps and containers.

NOTE 2 In the context of this part of ISO 22002, the term “packing” refers to the action of placing an agricultural product or food into one or more items of packaging.

3.12**pest**

unwanted species of plant or animal that may have a detrimental effect for humans, their activities or the products they use or produce, or for animals or for the environment

NOTE In the context of this part of ISO 22002, the term refers to small animals, birds, and insects that destroy crops, spoil food or spread disease in fields or on farm premises.

3.13**plant protection product**

any substance or microorganism, including a virus, or a mixture or solution composed of two or more of them, prepared in the form in which it is supplied to the user, intended to: protect plants or plant products against harmful organisms or prevent the action of such organisms; influence the life processes of plants other than as a nutrient; preserve plant products; destroy undesired plants or parts of plants; or check or prevent the undesired growth of plants

NOTE In the context of this part of ISO 22002, the term refers to herbicides, algicides, rodenticides, talpicides, leporicides, molluscicides, nematocides, insecticides, acaricides, fungicides, bactericides, viricides, disinfectants, repellents, attractants, fumigants, plant activators, plant growth regulators, elicitors of self-defence mechanisms, etc. intended to be used in growing, harvesting and post-harvest activities.

3.14

potable water

water of sufficiently high quality that can be consumed or used with low risk of immediate or long-term harm

NOTE Quality standards for drinking water for human consumption are described in the WHO *Guidelines for drinking-water quality*^[13].

3.15

veterinary drug

any substance applied or administered to any food-producing animal, such as meat or milk-producing animals, poultry, fish or bees, whether used for therapeutic, prophylactic or diagnostic purposes or for modification of physiological functions or behaviour

NOTE This definition of veterinary drugs includes parasiticides intended to be applied or administered to food-producing animals.

3.16

withholding period

withdrawal period

time during which a crop, an animal or its products cannot be used for human consumption following the last application of a plant protection product to the crop (including pastures), or the last application or administration of a veterinary drug to the animal, that ensures that the foodstuff does not contain any residues in quantities in excess of established maximum residue limits

4 General requirements

The organization developing the PRPs shall identify, select and maintain PRPs that:

- a) are able to minimize the likelihood of introducing contaminants and meet the requirements set down in this part of ISO 22002;
- b) enable the implementation of regulatory requirements related to protection against contamination;
- c) are among those recommended in this part of ISO 22002, by externally developed codes of practice targeting the type of farm production, by the processing plant receiving the farm end-product, or by the competent authority;

NOTE Externally developed codes of practice include international codes of practice listed in the Bibliography.

- d) are appropriate to the identified threats and to the size and nature of the farm.

The organization shall establish and maintain the appropriate documentation and records, such as:

- 1) the regulatory requirements, b), that are to be met by the selected PRPs;
- 2) the externally developed recommendations, c), from which the PRPs have been selected;
- 3) the description of the selected PRPs and how they are managed.

NOTE The management of PRPs includes, in particular, monitoring, verification, corrective actions and corresponding records and is part of the food safety management system requirements set down in ISO 22000.

5 Common prerequisite programmes

5.1 General

Food products can be contaminated in many ways. For example, waste, personnel, water, and equipment can constitute sources of contamination. Whatever the type of production considered, control measures exist to reduce the likelihood of contamination. This clause deals with the identification of those measures that are appropriate for implementation as PRPs.

5.2 Location

The organization shall implement measures that minimize the likelihood of introducing harmful contaminants from environmentally polluted areas.

The organization shall identify potential sources and the nature of such contamination in the neighbouring environment.

The organization shall identify water sources and reserves used for farming activities, e.g. springs, rivers and wells. The organization should identify on a map water sources and reserves, and locate sources of potential contamination. Local authorities can assist in the identification of water sources and reserves. Monitoring local district development plans is useful to foresee and prevent future problems.

Any previous accidents that could have contaminated the farm environment (e.g. fire, flood) should be described.

Depending on the operations and where appropriate to minimize the likelihood of food contamination, examples of PRPs that should be implemented are to:

- a) locate farming activities away from environmentally polluted areas and neighbouring activities which pose a serious threat of contaminating food;

NOTE Examples of environmentally polluted areas are areas with a history of industrial production, waste storage or nuclear fall-out; examples of potentially threatening neighbouring activities include roads with heavy traffic (e.g. lead contamination), incinerators (e.g. dioxin contamination), sewage treatment plants (microorganisms, heavy metals), other industries that can pollute water sources, land or air.

- b) plant crops or keep animals away from particularly high levels of specific contaminants (e.g. lead, cadmium, dioxins) to which they are sensitive;
- c) select water sources or reserves according to their intended use;
- d) protect from faecal contamination the water that is used for irrigating ready-to-eat fruits and vegetables.

Documentation should include an updated list/map of premises, water sources and reserves used, as well as identified contamination sources.

If the organization discovers information that can have an impact on the safety of its products, it shall take appropriate measures and inform the competent authority when necessary.

5.3 Construction and layout of premises

Farm premises shall be designed and constructed in such a way as to maintain an appropriate degree of hygiene and to minimize the likelihood of cross-contamination.

NOTE In crop production, an example of cross-contamination is the contamination between incoming (raw) products and washed and sorted products. In animal production, an example of cross-contamination is the contamination between the flow of effluents and the flow of feed.

Depending on the operations and where appropriate to minimize the likelihood of food contamination, examples of PRPs that should be implemented are to:

- a) separate changing and eating areas, from areas where foods are handled;
- b) control animal density by adapting livestock or animal size to the surface or volume of buildings, land or water;
- c) design facilities so as to allow separating groups or lots of animals, isolating sick or newly introduced animals, and preventing the introduction or spread of zoonotic diseases;
- d) design buildings in accordance with the required level of hygiene, by providing adequate ventilation, lighting and cleanability, so as to minimize the exposure of food producing animals and their products to contaminants and pests;

NOTE Examples of areas requiring a high level of hygiene are storage areas and places where food products are handled, for instance the milking facility.

- e) construct buildings with non-toxic and cleanable materials;
- f) store materials that may constitute a source of food contamination (e.g. plant protection products, detergents, disinfectants, fuel and oils, wastes and packaging) in specific and adapted locations;
- g) equip premises with properly designed and functioning toilets so as to minimize the likelihood of faecal contamination;
- h) equip premises with clean or potable water inlets appropriate to the intended use;
- i) provide potable water inlet for toilets in areas where the likelihood of contaminating foods from workers' hands is particularly high;
- j) identify potable and non-potable water pipes;
- k) design and equip facilities so as to collect and maintain away from animals and foods the effluents and waste waters that may result in food contamination;
- l) set premises and the immediate farm surroundings in a manner that allows an appropriate degree of drainage and to minimize the likelihood of food contamination from stagnant waters;
- m) set and maintain air-conditioning systems so as not to increase the likelihood of food contamination;
- n) design and equip facilities so as to prevent undesired animals from entering the facilities.

Documentation should include an updated map of the premises, locating the potential sources of food contamination (e.g. chemical products storage area) and the facilities necessary to minimize the likelihood of food contamination (e.g. water inlets).

5.4 Equipment suitability and maintenance

The organization shall design, install and use equipment in such a way as to maintain an appropriate degree of hygiene. Equipment shall not itself constitute a source of food contamination.

The organization shall identify and implement measures to minimize the likelihood of food contamination by pollutants from heavy equipment used in field operations (e.g. oil leak, gas emission).

The organization shall install and use equipment in accordance with the conditions of use provided by the manufacturer, or, if not available, technical standards.

The equipment shall be kept in proper working condition. The organization shall follow the manufacturer's instructions for maintaining equipment intended to come in contact with foods. Harvest containers shall be checked and maintained in good condition (e.g. no damage).

Depending on the operations and where appropriate to minimize the likelihood of food contamination, examples of PRPs that should be implemented are to:

- a) use food contact equipment (e.g. a milk tank) that is:
 - 1) made of materials that do not increase the likelihood of chemical contamination of foods;
 - 2) designed so as to allow appropriate sanitary inspection, cleaning and, if necessary, disinfection;
 - 3) designed so as to allow a complete drainage and, where necessary, the prevention of post-disinfection contamination from the environment;
- b) verify, calibrate, maintain or replace equipment regularly, and, in all cases, in accordance with the manufacturer's instructions;

- c) install and maintain washbasin, soap and drying material or equipment at the immediate vicinity of a potable water inlet, or a disinfecting hand cleanser, where there is a likelihood of workers' hand contamination or hand-borne food contamination.

NOTE Toilets are an example of a facility where the risk of contaminating workers' hands is particularly high. A milking room is an example of facility where the risk of contaminating foods from workers' hands is particularly high.

Documentation should include a list of the equipment with information about instruction for use. Records should include the history of main maintenance operations, including those outsourced (e.g. identification of the personnel who carried out the operation, date of operation).

If the organization discovers information about the equipment or its use that can have an impact on the safety of foods, it shall take immediate appropriate action to correct the deviation and, when necessary, inform the competent authority, the equipment's manufacturer or the next step in the food chain.

5.5 Personnel hygiene

Personnel shall maintain an appropriate degree of personal cleanliness and behave and operate in a manner that is appropriate to the required degree of hygiene. The organization shall maintain a level of personal competency that is sufficient to implement this requirement.

The organization shall:

- a) establish and communicate practices for personal cleanliness, behaviour and operation that is appropriate to the operations carried out;
- b) maintain communication and personal competency (including temporary personnel) that implement and maintain these practices;
- c) whenever appropriate, maintain practices to ensure that visitors do not represent a source of contamination.

Depending on the operations and where appropriate to minimize the likelihood of food contamination, examples of PRPs that should be implemented are designed for personnel to:

- 1) wear suitable protective clothing, head covering, and footwear that is cleaned or changed regularly;
- 2) wash hands frequently, with or without specifying when (e.g. after visits to toilet, prior to handling of food, milking or collection of eggs);
- 3) promote the voluntary reporting of personal health conditions that may contaminate foodstuffs and animals;
- 4) cover injuries on hands or forearms with suitable waterproof dressings;
- 5) prohibit smoking in areas where food products are handled;
- 6) restrict personal belongings brought into food handling areas;
- 7) restrict entry to the farm;
- 8) train on the use of chemical products (e.g. plant protection products);
- 9) train on harvesting and handling of specific products (e.g. milking, fish harvesting, placing poultry into crates, egg handling, handling of fragile fruits);
- 10) ensure effective communication on hygiene practices, e.g. graphical display of hand washing technique.

Documentation should include a description of the personal hygiene practices applicable.

People known to be infected with, or carrying, a disease or illness transmissible through food or food-producing animals shall be prevented from handling food-producing animals, foods and materials which come into contact with food.

5.6 Working animals

Working animals used for farming activities shall not increase the likelihood of contaminating foods.

The organization shall identify and implement measures to minimize the likelihood of transferring contaminants from working animals to foods, directly or indirectly through food-producing animals.

If there is a sudden death of a working animal, or signs suggestive of a disease that can increase the likelihood of food contamination, the organization shall ask for advice from a veterinarian or similarly recognized competent person in animal health and take appropriate action to prevent contact with foods and food-producing animals.

Depending on the operations and where appropriate to minimize the likelihood of food contamination, examples of PRPs that should be implemented are to:

- a) keep working animals in good health by appropriate check-up, treatment, or vaccination by or upon recommendation of a veterinarian or similarly recognized competent person in animal health;
- b) prevent working animals from entering or staying in facilities where the likelihood of food contamination is particularly high.

5.7 Purchasing management

Introducing feed, seeds, animals, fertilizers, plant protection products, veterinary drugs, packaging or any other material into the farm shall be done in such a way as to minimize the likelihood of food contamination.

The organization shall identify and implement measures to ensure that goods and animals introduced into the farm are appropriate for the intended use and will not increase the likelihood of food contamination.

Depending on the operations and where appropriate to minimize the likelihood of food contamination, examples of PRPs that should be implemented are to:

- a) establish specifications and implement material inspection upon delivery;
- b) refuse goods, animals or delivery vehicles that do not conform to relevant specifications (e.g. unacceptable mould contamination or other defects), or limit their access to an area where the likelihood of food contamination is minimized;

NOTE An example of inspection upon delivery is the verification of labelling, product integrity, and visual aspect of feed.

- c) control that feed is suitable for the intended use, in particular the animal species and type of production;
- d) ask for advice from a competent person or body if there is any doubt on the quality of feed.

Records should include the history of relevant inputs introduced into the farm. They shall include the history of animal introduction with the associated health and traceability documentation, and the results of examinations carried out in the context of animal introduction. They shall include the history of introduction of feed, plant protection products, veterinary drugs, fertilizers with the identification of suppliers and, where appropriate, sanitary documents or information about components.

If the organization discovers that goods or animals introduced into the farm can have a detrimental impact on the safety of foods (e.g. presence of hazardous material or substance in the feed), it shall take appropriate measures and, when necessary, inform the next step in the food chain, the supplier or the competent authority.

5.8 On-farm storage and transport

During on-farm storage and within-farm transport, the organization shall protect the food from possible contamination and implement measures to minimize the likelihood of increasing hazard levels and occurrence.

Storage areas and transport containers shall be designed to allow maintenance and cleaning and to minimize deterioration of products.

Food packaging materials, including containers used for storage or transport of food, shall be suitable for the intended food contact purpose.

The organization should maintain traceability of all food lots throughout on-farm storage and on-farm transport operations.

Depending on the operations and where appropriate to minimize the likelihood of food contamination, examples of PRPs that should be implemented are to:

- a) store harvested products intended for human consumption in an appropriate area which is kept at a suitable level of hygiene, or minimize the waiting time in the field after harvest — particular attention should be paid to the risk of contamination by animals;
- b) implement appropriate control measures aimed at minimizing the likelihood of development of undesirable microorganisms or the production of toxins in foods or feed, by appropriate conditions of temperature, humidity or duration of stay or transport;
- c) apply temperature control systems that take into account the intrinsic characteristics (e.g. water activity, pH, and likely initial level and type of microorganisms), the intended shelf-life, the method of packaging, and the intended use (e.g. further cooking and processing or ready-to-eat) of foods and feed;
- d) store perishable foods in appropriate conditions such as temperature and humidity, and in properly designed containers placed in a clean area;
- e) consult and follow the instructions provided by the receiving processing plant as far as they relate to applying and monitoring temperature, time and other criteria identified as the results of the processor's hazard analysis for the storage of farm end-products intended for further processing;
- f) ensure a satisfactory turnover of farm end-products by applying the general principles of the first-in, first-out method, when the quality or shelf-life may be impacted within the intended storage time;
- g) prevent products of plant origin and products of animal origin from being mixed during storage or transport, when appropriate protection against cross-contamination is not in place;
- h) keep storage areas and transport containers where unprotected foods are placed free from visible contamination (e.g. foreign matter, waste);
- i) store food-contact packaging material in an appropriate area which is kept at a suitable level of hygiene;
- j) store feed in a place which is kept at an appropriate degree of hygiene and where the likelihood of pest access and proliferation is minimized by implementing suitable systems;
- k) manage feed supply and storage so as to prevent mixing of feed and feed ingredients from different types and sources;
- l) use and store chemicals in accordance with the manufacturer's instructions, in an area of limited access and away from food handling activities, when they may contaminate food and water sources;
- m) ensure that all chemicals are labelled to show the identification of product and manufacturer, instructions for use and, where applicable, lot identification, expiry date and approvals by the competent authority;

NOTE Chemicals include cleaners, sanitizers, rodenticides, insecticides, food grade machine lubricants, etc.

- n) restrict, in areas where food is exposed, the storage and use of hazardous chemicals to those:
 - 1) required for maintenance of clean and sanitary equipment and surfaces,
 - 2) necessary for use in laboratory testing procedures,
 - 3) necessary for equipment maintenance and operation,

- 4) necessary for use in operations.
- o) store plant protection products in a locked, dedicated, properly ventilated space whose access is controlled, when there is a likelihood of misuse;
- p) store veterinary drugs in accordance with the labelled instructions, in particular in terms of storage temperatures and darkness;
- q) store fertilizers separately from food products and other chemical products;
- r) cover containers during transport;
- s) ensure sufficient storage capacity for animal effluents stored on farm premises in proximity to foods, crops or food-producing animals, and prevent leakage that may result in food contamination.

Records shall include the results related to the monitoring of storage conditions relevant for food safety, e.g. temperature and humidity.

Records should include information necessary for ensuring the traceability of all food lots during transport and storage operations within the farm.

The organization shall dispose of any stored product that is unusable for food safety reason (e.g. those past their expiry date, damaged products) or does not comply with end-product food safety criteria specified by the receiving client.

5.9 Cleaning

In farming facilities, the organization shall maintain the degree of hygiene that is necessary to minimize the likelihood of food contamination. It shall maintain the cleanliness of the surfaces of all premises and equipment, including transport containers, which may constitute a source of food contamination (e.g. surfaces in direct contact with food). Cleaning shall not result in food contamination. Cleaning and disinfection shall be effective in achieving the degree of cleanliness required.

The organization shall:

- a) identify premises and equipment that need to be cleaned;
- b) appoint competent personnel to perform cleaning;
- c) establish operating procedures for the cleaning of surfaces that are potentially in contact with food products and feed — the operating procedures shall include, depending on the operations carried out, the nature of the product, and type of surface material:
 - 1) a description of the cleaning process (e.g. steps involved, temperatures, times),
 - 2) the cleaning frequency appropriate to the use of the area, equipment, etc.,
 - 3) the names (e.g. trade names) of cleaning and disinfecting products used and which have been approved for food contact usage,
 - 4) the quality of the water used, which depends on the equipment cleaned and on the type of products likely to be contaminated,
 - 5) the verification criteria that determine the cleanliness required.

NOTE The degree of cleanliness is determined by the criteria used to verify the cleaning procedure [e.g. visual inspection (daylight, UV-light), microbiological testing].

The organization shall follow the manufacturer's instructions when using sanitizers [e.g. method of preparation, including concentration, temperature of use, mechanical action required (i.e. turbulence, scrubbing) to remove soil and biofilm, waiting time before rinsing, if any, and withholding period before contact with food or food-producing animals, if any].

Depending on the operations and where appropriate to minimize the likelihood of food contamination, examples of PRPs that should be implemented are to:

- a) clean the milking equipment (lines and teat suction cups) after every milking and the milk storage containers after each emptying, when there is a likelihood of milk contamination from milk residues or biofilms;
- b) rinse with potable water the milking equipment and storage containers, when there is a likelihood of contamination with residues of detergents used for cleaning;
- c) use clean water for disinfection activities;
- d) clean equipment that could act as vectors of cross-contamination with chemicals;
- e) clean and disinfect the reusable egg containers prior to use and upon their return to the farm, so as to prevent egg contamination;
- f) prevent containers, equipment and facilities that have been used for storing, transporting, mixing or spreading potentially hazardous material (e.g. plant protection products or medicated feed) from being reused for food or feed, unless a cleaning procedure validated to be effective in removing the hazardous material has been applied;
- g) clean and, where necessary, disinfect buildings once all animals in the building concerned have been moved to another rearing location or slaughterhouse, so as to ensure an effective maintenance of an appropriate degree of hygiene and the protection against transmission of animal disease;
- h) prevent animals from being introduced into the facilities during an appropriate drying out period after cleaning or disinfection;
- i) maintain troughs and automatic feeders at an appropriate level of hygiene.

Documentation should include operating procedures for the cleaning of surfaces that can come in contact with food products and feed.

If the organization detects quality problems in farm end-products that may be caused by failure in or ineffective cleaning, the cleaning operating procedure in question shall be reviewed and amended as necessary.

5.10 Waste management

The organization shall ensure that waste produced, transported, recycled, composted and stored on farm premises does not harbour pests at a level that could increase the likelihood of food contamination and does not constitute a risk of contaminating farm end-products.

The organization shall identify which types of waste, including human and animal effluents, that, taking into account its handling on the farm, are likely to contaminate food products or affect food safety.

The organization shall implement procedures for the proper handling and disposal (or reuse) of on-farm waste.

Depending on the operations and where appropriate to minimize the likelihood of food contamination, examples of PRPs that should be implemented are to:

- a) dispose of wastes with an appropriate frequency;
- b) identify, properly maintain waste containers, and keep them closed in areas where pest proliferation can increase the likelihood of food contamination;
- c) isolate, identify as waste for disposal and dispose of in a specified safe manner, the chemicals and similar products of concern to food safety (e.g. veterinary drugs, plant protection products) that cannot be used (e.g. due to an exceeded expiry date), as well as the empty containers from which such substances have been removed;
- d) dispose of, in an appropriate way, the waste waters coming from the cleaning of equipment used for plant protection products;

- e) compost organic waste material that is used for soil conditioning in a way that mitigates the likelihood of contaminant carry-over.

Documentation should include an updated list of wastes that are likely to contaminate food products or affect food safety. Records should include the history of waste disposal operations for wastes likely to significantly contaminate food products and affect food safety.

5.11 Pest control on farm premises

When pest access and proliferation on the farm can result in contamination of food, the organization shall establish and maintain a pest control system to monitor and control pest access and proliferation on the farm in a manner that does not result in contamination of food with pest remains or anti-pest substances.

NOTE This subclause deals with measures aimed at controlling pests that invade or infest farm buildings, equipment and storage facilities. The use of plant protection products is addressed in 6.4.

Only pest control chemicals that are authorized by the competent authority shall be used. These products shall not come into contact with food and feed products or livestock.

Pest control chemicals shall be used following the manufacturer's instructions and their effectiveness shall be verified by visual inspection of premises.

Depending on the operations and where appropriate to minimize the likelihood of food contamination, examples of PRPs that should be implemented are to:

- a) place UV light traps used for controlling the occurrence of flying insects not above products or conveyors of products;
- b) minimize contacts between farm end-products or food-producing animals with wild or other non-domestic animals, when such contact can increase the likelihood of food contamination or the transfer of zoonotic agents to food-producing animals;
- c) install physical barriers (e.g. fences) and or active deterrents (e.g. noise makers, scarecrows, surrogates of owls, foil strips) where appropriate to minimize crop contamination in the fields;
- d) install physical barriers (e.g. nets) on the access points such as windows, vents, and drains of the premises, so as to prevent pests from entering food storage facilities.

Records shall include the history of any observed occurrence of pests or symptoms attributable to pests, that may affect the safety of foods, and the history of anti-pest actions whose residues may contaminate foods.

If the organization observes pests on premises where food is stored, or observes pest in any other location at a level that may increase the likelihood of food contamination, it shall take the appropriate actions to remove pests, prevent the reoccurrence, or reduce its occurrence at an appropriate level. If pest control chemicals, or their use, appear to be ineffective, the organization shall take appropriate actions to modify the products or their conditions of use.

5.12 Management of products suspected to be unsafe

Products suspected to be unsafe shall not be a source of food contamination, directly by coming into contact with safe foods or indirectly through the environment (e.g. water, soil, fields) and food-producing animals.

The organization shall establish and implement appropriate measures to minimize the likelihood of food contamination by products suspected to be unsafe.

Depending on the operations and where appropriate to minimize the likelihood of food contamination by products suspected to be unsafe, examples of PRPs that should be implemented are to:

- a) evaluate the safety of other products that were produced or stored in the same conditions;
- b) remove from the food chain all products suspected to be unsafe;

- c) handle products suspected to be unsafe so as to minimize the likelihood of cross-contamination during their storage and disposal.

Records shall include the history of the management of products suspected to be unsafe, including their identification and movements.

5.13 Outsourced activities

Outsourcing all or part of the farming activities shall not increase the likelihood of food contamination.

The organization shall implement measures to identify and select outsourced organizations.

Depending on the operations and where appropriate to ensure that outsourced activities do not increase the likelihood of food contamination, examples of PRP that should be implemented are to:

- a) establish specifications for the selection of suppliers;
- b) verify that the suppliers meet the requirements set down in this part of ISO 22002.

NOTE Examples of verification include the audit of suppliers by the organization.

Documentation should include the specifications and contractual agreements for any outsourced activities, and records should include the results of verification.

6 Prerequisite programmes specific to crop production

6.1 General

In addition to the PRPs concerning the general farm environment, some general control measures appropriate for implementation as PRPs are relevant solely to plant production. This clause deals with the identification of those PRPs that, in general, minimize the likelihood of contamination of crops at all stages of the plant production and assist in controlling food safety hazards in the food chain.

6.2 Irrigation

Water used for irrigation purposes shall not introduce contaminants to crops.

The organization shall evaluate the irrigation system (i.e. water quality used for irrigation and its application method) for its intended use.

Depending on the operations and where appropriate to minimize the likelihood of water-borne contamination, an example of a PRP that should be implemented is adapting water quality to the nature of crops (e.g. root vegetable, fruit), to the subsequent processing (e.g. no processing, cooking), and to the way the product will be consumed or used (e.g. cooked, raw). Products that have physical characteristics such as rough surfaces that can retain water, particularly those without such further processing as thermal or similar microbicidal treatment, should be irrigated with clean water or using subsurface or drip irrigation to minimize the wetting of the edible portion of the crops.

Records should include the history of the periodical evaluations (e.g. water quality analysis) of the irrigation system.

If the organization discovers information on irrigation that can have an impact on the safety of its products, it shall take appropriate measures and, when necessary, inform the competent authority.

6.3 Fertilization

Fertilization shall not increase the likelihood of crop contamination.

Fertilizers (e.g. sludge from treatment plants, mineral fertilizers) shall comply with local or regional regulations and, when applicable, be authorized by the competent authority. Suppliers shall be identified.

The organization shall identify and implement appropriate measures to minimize food contamination during fertilization operations.

Depending on the operations and where appropriate to minimize the likelihood of microbiological contamination, an example of a PRP that should be implemented is the spreading of manure, biosolids, and other natural fertilizers that have gone through all required steps of composting; or, in the case of fertilization with untreated or partially treated fertilizers, applying an appropriate holding time before a crop can be harvested.

Records should include the history of fertilization operations, with relevant information (e.g. fertilizer identification and composition, conditions of use, date and place of application, identification of the personnel who carried out the operation).

6.4 Plant protection products

Plant protection products shall be used in a manner that avoids residues on or in the crops exceeding any maximum residue levels (MRLs) as established by the competent authority.

The organization shall use plant protection products in accordance with all applicable laws and regulations. The application of plant protection products shall be justified by observation or diagnosis, except for specific programmes of pest control. Applications shall be reduced to their minimum, taking into account the product efficiency, the goal to be reached, and following the manufacturer's instructions.

The organization shall identify the plant protection products used and which are appropriate to its crop production.

The organization shall establish appropriate methods of using the plant protection products, including the appropriate maintenance of equipment applied and the handling of products in stock and related waste.

Depending on the operations and where appropriate to minimize the likelihood of food contamination by plant protection product residues, examples of PRPs that should be implemented are to:

- a) purchase plant protection products from suppliers that are registered or approved;
- b) apply the manufacturer's instructions, as regards the applicable crops, the application period, the dose, the withholding period, or the weather conditions required for the effective use of plant protection products;
- c) verify and maintain all equipment used for the preparation and application of plant protection products, in particular as regards the observance of spread dosage.

Records shall include the history of use of plant protection products, with relevant information (e.g. commercial name, dose, date of treatment, date of harvest, field identification or the crops sprayed).

If the organization discovers information on misuse of plant protection products that can have an impact on the safety of its end-product, it shall take appropriate measures and, when necessary, inform the competent authority.

6.5 Harvest and post-harvest activities

6.5.1 Harvest

The harvest activities shall not increase the likelihood of crop contamination.

The organization shall identify the potential sources and nature of contamination that can occur during harvest operations and implement the appropriate measures to minimize the likelihood of contamination.

Depending on the operations and where appropriate to minimize the likelihood of food contamination, examples of PRPs that should be implemented are to:

- a) harvest no earlier than the end of applicable withholding periods corresponding to fertilization or any other treatment with plant protection products;

- b) minimize the mechanical damage to the products and duration of harvesting operations;
- c) discard damaged or decayed crops;
- d) minimize the likelihood of contamination crops with foreign bodies (e.g. metallic or plastic materials, toxic plants).

Records should include the history of harvesting operations with relevant information regarding product identification, location and date of harvest, harvesting equipment or personnel who carried out the operations.

If the organization discovers that the required withholding period related to the use of plant protection products was not applied, it shall take appropriate measures to prevent the affected crops from entering the food chain and inform, when necessary, the competent authority or the operator of the next step in the food chain.

6.5.2 Post-harvest activities

The post-harvest activities shall not increase the likelihood of contamination of end-products.

The organization shall identify the potential sources and nature of contamination related to post-harvest operations and implement appropriate measures to minimize the likelihood of food contamination.

Depending on the operations and where appropriate to minimize the likelihood of food contamination, examples of PRPs that should be implemented are to:

- a) sort or inspect harvested products so as to discard defective products and foreign bodies;
- b) minimize the likelihood of introducing foreign matter during packing operations;

NOTE Examples of sources of contamination during packing are parts of the equipment, personnel items or hairs, and packaging materials.

- c) use water or ice of appropriate quality for rinsing, decontaminating or cooling products — water should be potable when used for the washing of products intended to be consumed raw without further industrial processing, such as thermal or similar microbicidal treatment.

7 Prerequisite programmes specific to animal production

7.1 General

In addition to PRPs concerning the general farm environment, some general control measures appropriate for implementation as PRPs are relevant solely to animal production. This clause deals with the identification of those PRPs that in general minimize the likelihood of contamination of products derived from food-producing animals and assist in controlling food safety hazards in the food chain.

7.2 Feed and water for animals

7.2.1 On-farm feed production

On-farm feed production activities shall not increase the likelihood of contaminating foods by transmitting contaminants to food-producing animals.

The organization shall identify and implement measures to minimize the likelihood of feed contamination when selecting, cultivating, preparing, and storing feed and feed ingredients.

The organization shall produce feed by using feed ingredients, e.g. water, additives, medicated premixes, that do not increase the likelihood of food contamination. It shall apply the conditions of use recommended by feed ingredients manufacturers. Water used as feed ingredient shall be clean.

Depending on the operations and where appropriate to minimize the likelihood of food contamination, examples of PRPs that should be implemented are to:

- a) check that additives and medicated premixes are handled and stored so as to maintain their integrity and that they are used in accordance with the manufacturer's instructions (e.g. doses, withholding periods and protocol of use such as mixing time);
- b) ensure that the equipment is operated under conditions that allow the appropriate mixing of the ingredients (e.g. not overfilled) and that it is purged, rinsed or cleaned after each run of feed production.

Records should include the history of feed production with the identification of animals or groups or lots of animals which were fed. Where relevant, the documentation should include the formula and a description of the production process.

If the organization discovers that feed produced on the farm can have a detrimental impact on the safety of foods (e.g. presence of hazardous material or substance), it shall take appropriate measures and, when necessary, inform the next step in the food chain or the competent authority.

7.2.2 Feeding and watering

The activity of feeding and watering animals shall not increase the likelihood of food contamination by transmitting contaminants through food-producing animals.

The organization shall define and implement measures to ensure that feed and water are suitable for food-producing animals and do not increase the likelihood of food contamination.

NOTE Species and physiological state are examples of parameters that can influence the suitability of feed.

Depending on the operations and where appropriate to minimize the likelihood of food contamination, examples of PRPs that should be implemented are to:

- a) adapt the quantity of feed delivered to the animals to their physiological needs and removing feed that was refused before refilling;
- b) identify the animals or groups of animals while they are fed medicated feed or during the subsequent withholding period if applicable.

7.2.3 Pasture

Pastures, including paddocks, shall not be a source of food contamination by transmitting contaminants to grazing food-producing animals.

NOTE Contaminants that occur on pastures include those that are voluntarily or accidentally introduced by human activity, and those that naturally occur, e.g. toxic plants.

The organization shall identify and implement measures to minimize the likelihood of pasture contamination and the likelihood of transmitting contaminants to grazing animals.

Depending on the operations and where appropriate to minimize the likelihood of contamination originating from manure, fertilizers or plant protection products, an example of PRP that should be implemented is strict adherence to the manufacturer's instructions for pasture spraying and, where applicable, prevention of animals from grazing those pastures for an appropriate time.

If the organization discovers information about pastures or surrounding activities that can affect food safety, it shall take appropriate measures to protect food-producing animals from contamination and, when necessary, inform the competent authority.

7.3 Health management

7.3.1 Identification and movements

The movements of animals or groups of animals outside farm premises, on the farmer's initiative or not, shall not increase the likelihood of contaminating foods.

NOTE Transhumance and grazing on mountain pastures are examples of circumstances where animal movement occurs.

The organization shall identify and implement measures to control animal movement.

Depending on the operations and where appropriate to minimize the likelihood of food contamination, examples of PRPs that should be implemented are to:

- a) identify animals or groups of animals by appropriate means so as to ensure effective movement control;
- b) prevent animals from coming into contact with other species while they are moved, so as to minimize the likelihood of food contamination by zoonotic agents;
- c) maintain barriers (e.g. fences, working animals, waterways) to prevent animals from moving to neighbouring properties where there is a likelihood of contamination.

Documentation shall include an updated list of food-producing animals, at either individual or lot level, with relevant information (e.g. species, identification, age, sex). When appropriate, records should include the history of animal movements (e.g. movements between different establishments within the same organization, seasonal grazing).

If the organization discovers any potential impact on the safety of its products due to animal movement, it shall take appropriate measures and, when necessary, inform the competent authority.

7.3.2 Health monitoring

Animals shall remain in a healthy condition at all times so as not to increase the likelihood of contaminating foods.

The organization shall identify and implement measures for the early detection of animal disease that could increase the likelihood of food contamination. The organization shall identify and implement measures for the assessment of the health status of newly introduced animals and for minimization of the likelihood of transmitting zoonotic agents to the herd.

NOTE An example of a contaminant that poses a serious threat is the zoonotic agent of tuberculosis in cattle.

Depending on the operations and where appropriate to minimize the likelihood of food contamination by allowing an effective monitoring of animal health, examples of PRPs that should be implemented are to:

- a) implement a regular visual examination of animal behaviour and integrity;
- b) implement a system to monitor animal production performance to assist in the early detection of diseases or injuries;
- c) establish an animal health plan, including prophylactic measures, upon recommendation of a veterinarian or similarly recognized competent person in animal health;

NOTE Examples of prophylactic measures are vaccination and eradication programmes.

- d) verify the accompanying health and traceability documents of introduced animals, as well as their proper identification (e.g. tag, mark) if applicable;
- e) quarantine introduced animals at delivery and have their health status checked by a veterinarian or similarly recognized competent person, by means of appropriate tests or physical examination.

Records shall include the history of prophylactic measures, visits done by a veterinarian or similarly recognized competent persons in animal health, and occurrence of animal diseases that may increase the likelihood of food contamination.

If there are signs suggestive of a disease that can increase the likelihood of contaminating foods, the organization shall ask for advice from a veterinarian or similarly recognized competent person in animal health.

If signs of animal disease are discovered or suspected later in the food chain (e.g. ante- and post-mortem inspections at the slaughterhouse) and notified to the organization, it shall take appropriate action by asking for advice from a veterinarian or similarly recognized competent person in animal health.

7.3.3 Management of sick animals

Sick animals shall not be a source of food contamination.

The organization shall identify and implement measures for the management of sick animals and their products so as not to increase the likelihood of contaminating foods.

Depending on the operations and where appropriate to minimize the likelihood of food contamination, examples of PRPs that should be implemented are to:

- a) identify and separate sick or injured animals from healthy herd mates, until cured or fit for purpose;
- b) select the measures ensuring the effective control of spread of transmissible diseases, upon advice from a veterinarian or similarly recognized competent person in animal health;
- c) exclude sick animals and their products from the food or feed chain;
- d) collect separately the products from healthy animals and the products from sick animals or animals suspected to be sick so as to minimize the likelihood of cross-contamination;
- e) have purchased animals examined by a veterinarian or similarly recognized competent person in animal health before allowing them to enter the farm when they show signs of clinical disease, and follow the recommendations made by the veterinarian or similarly recognized competent person in animal health.

Records should include the history of animal disease and how the animals, and if applicable their products, were managed.

If the organization discovers that a sick animal, or its products, have not been excluded from the food or feed chains and are posing a serious threat to food safety, it shall take appropriate measures to inform the next step in the food chain and the competent authority when necessary.

7.3.4 Management of dead animals

Dead animals and the disease causing the death shall not increase the likelihood of food contamination.

NOTE This part of ISO 22002 covers aborting fetuses, but not animals that enter the food chain after slaughter, including on-farm emergency slaughter.

The organization shall identify and implement measures for the determination of the cause of death and that minimize the likelihood of contaminating foods from the animal body or from any other source of contamination. Such dead animals shall not enter the food and feed chains.

Depending on the operations and where appropriate to minimize the likelihood of food contamination, examples of PRPs that should be implemented are to:

- a) have the cause of death diagnosed by a veterinarian or similarly recognized competent person in animal health when possible;
- b) inform the competent authority when the death is associated with a serious threat to food safety;
- c) move dead animals with no delay to a specific and adapted location, away from healthy animals and their products, prior to destruction in conditions that allow the likelihood of food contamination to be minimized.