

# TRAINING

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# NOTEBOOK

- AGRICULTURAL PRODUCTION AND PROCESSING -

## OPERATOR SAFETY AND GOOD CROP PROTECTION PRACTICES



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# **- AGRICULTURAL PRODUCTION AND PROCESSING -**

## **OPERATOR SAFETY AND GOOD CROP PROTECTION PRACTICES**

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# LEAFLET 1

## Risk analysis, safety and health policy

### EDUCATIONAL OBJECTIVES

On completion of this training sequence, the participant must be able to:

- List and describe briefly the 5 steps of occupational risk analysis.
- Explain the classification of hazards based on their types.
- Define the health and safety policy concept.
- Describe the standard content of a health and safety policy.

### KEY MESSAGES

#### 1) Occupational risk analysis

Occupational risk assessment (ORA) is the first stage of a successful occupational safety and health policy. This analysis relies on the following steps:

- Division of each process/task into its basic stage (drawing up a process diagram);
- Identification of the hazards associated with each stage. Hazards can be classified on the basis of the “Globally Harmonised System” of Classification and Labelling of Chemicals (GHS). The GHS establishes a pictogram, a signal word, a hazard statement and precautionary statement for each hazard category. The hazards are of three kinds: chemical - biological - physical;
- Assessment, for each stage, of the risks related to these hazards. The degree of risk resides in both the probability of the event and severity of the result (type of injury, number of persons affected, etc.);
- Selection of the priority risks. The priorities identified are discussed with employee representatives, as a preliminary to the drafting of an action plan by the company director (objective - activities - manager - deadline - resources);
- Proposal of solutions and development of control measures for each of the risks identified.

#### 2) Defining a safety and health policy

The “safety policy” is a written document that spells out how health and safety will be addressed within the organisation. The three following points generally appear :

- General safety and health policy statement :

This document should express the long-term strategic health and safety objectives and states the company’s commitment to achieving these objectives.

- The organisation of responsibilities.

A member of senior management will assume full responsibility for workers’ safety and health. The





# LEAFLET 2

## Fundamentals of toxicology

### EDUCATIONAL OBJECTIVES

On completion of this training sequence, the participant must be able to:

- Define the concepts of toxicity and exposure.
- Quote the formula measuring the risk of intoxication.
- Classify and describe briefly the forms of poisoning.
- List the characteristics of acute and chronic toxicity (poisoning).

### KEY MESSAGES

#### 1) Toxicology

- Toxicology is the scientific study of the nature, effects, transfer to key organs and detection of toxins in living organisms.
- It incorporates two key concepts:
  - Toxicity which refers to the concept of “hazards”.
  - Exposure which refers to the concept of “risk”.

This can be expressed as follows:

Risk (of intoxication) = Toxicity × Contamination (exposure) × Time (length of contact with the plant protection products). To reduce risk, action can be taken on each of the terms of this equation.

- The complexity of plant protection product formulations influences both toxicity (synergistic effects, antagonist effects, etc.) and exposure (powder, granules, liquids, etc.).

#### 2) Forms of poisoning

Forms of poisoning are designated according to the frequency and length of exposure to the toxin.

- Acute toxicity of a product is its capacity to alter vital functions after a single dose.
- Chronic poisoning occurs after prolonged exposure at low and repeated doses. Chronic poisoning is explained by:
  - Persistence, i.e. the persistence of the product in the environment and living beings in relation to their chemical stability;
  - Affinity for biological tissues and, in particular, liposolubility, which determines prolonged fixation in living organisms.

These 2 conditions give the chemical agent a bioaccumulation potential, which results in a concentration in food chains from one level to the next, reaching very high values in the final links in the chain (man, carnivorous animals, etc.).







# LEAFLET 3

## Exposure to plant protection products

### EDUCATIONAL OBJECTIVES

On completion of this training sequence, the participant must be able to:

- Describe the methodology used to assess the exposure of a population to a toxic substance.
- Classify the absorption routes for substances.
- Describe what happens to a substance once in the organism.
- List the different methods of evaluating operators' risk of exposure.

### KEY MESSAGES

#### 1) The circumstances of exposure

- Determining the exposure means taking a look at all possible sources of contamination and the circumstances of contact with the toxic substances.
- First of all, a "treatment scenario" should be determined, where detailed findings on plant protection product application methods are listed (product, doses, areas, equipment, etc.).
- This scenario is used to draw up the conceptual exposure diagram which represents:
  - The different environmental categories likely to contain directly or indirectly hazardous substances;
  - Vectors for the transfer of pesticides, which are the paths by which they transit between the different environmental compartments;
  - Routes of exposure (absorption routes: oral, dermal and respiratory).

#### 2) Absorption, distribution and metabolism

Once absorbed by mouth, breathing or through the skin (main absorption route):

- The substance can be transported throughout the organism (distribution) and remain stored and concentrated in certain tissues (such as fatty tissues).
- The substance may undergo a biotransformation (or metabolism), carried out mainly by the liver, which results in detoxification (production of a less toxic product) or an activation (production of a more toxic product).
- Finally, the unchanged substance and/or its metabolites can be expelled from the organism (excretion) through the kidneys, lungs, gastro-intestinally, cutaneously or via breast milk.





# LEAFLET 4

## Limiting exposure, applicator protection

### EDUCATIONAL OBJECTIVES

On completion of this training sequence, the participant must be able to:

- Define the two basic principles for limiting exposure to plant protection products.
- Classify the handling procedures to avoid exposure at each step of a phytosanitary treatment.
- Associate PPE with the products to be used.
- Associate the types of PPE with the types of activity to be carried out and the products to be used.
- Differentiate between permeation and penetration.

### KEY MESSAGES

#### 1) Limiting exposure

- It is possible to avoid all contact with the skin, the respiratory system and the digestive system by following two basic principles:
  - Handle the products carefully.
  - Wear the right personal protective equipment (PPE).
- Operators need to be trained in evaluating risks, knowing the danger and the route of contamination, handling products correctly and wearing PPE the right way.

#### 2) Precautions to observe when handling

A series of precautions and handling rules is associated with each stage of the phytosanitary treatment:

- During measuring and mixing:
  - Read the label carefully.
  - Use the right equipment (buckets, filters, dosing utensils, etc).
- During the treatment:
  - Weather conditions not only influence how effective a treatment is but they also play a role in the applicator's exposure to the product.
  - Check that the application equipment is working correctly.
  - Do not drink, smoke or eat near the product.
- After application:
  - Wash all the equipment after use,
  - Respect the interval to wait before entering the treated field.
  - Respect all intervals to wait (minimum time that must be observed between the last treatment and harvesting, for instance).





# LEAFLET 5

## Product packaging and labelling

### EDUCATIONAL OBJECTIVES

On completion of this training sequence, the participant must be able to:

- List the roles of packaging.
- Give the criteria to select the type of packaging materials to be used.
- List the minimal information required on the label of a plant protection product.
- Describe briefly the symbols of a label (colour bands and pictograms).

### KEY MESSAGES

1) “Product packing” includes packaging (flask, box, etc.) and labelling

2) Packaging of plant health products

- Packaging has different roles, such as product identification, safer storage and transport, making handling easier and less risky, etc.
- The choice of packaging materials depends on:
  - commercial aspects (marketing);
  - legal aspects (e.g.: packaging must meet the testing criteria required by the regulations for HAZMAT transport);
  - technical aspects (compatibility of the container and the contents, intended use).

3) Labels

- The information given on the label is the main way of explaining to users how to employ plant protection products effectively and with the least risk.
- The label’s contents and its size can be defined in regulations, but the presentation of texts and pictograms is not strictly regulated. In response to this, the FAO has prepared a template for the arrangement of the text zones.
- The following information generally appears on the label:
  - Trade name,
  - Type of product,
  - Authorised uses,
  - Sales authorisation,
  - How to apply the product, recommendations for use,
  - Precautions for the safety of humans and the environment,
  - FAO hazard class symbol.





# LEAFLET 6

## First aid in case of an accident

### EDUCATIONAL OBJECTIVES

On completion of this training sequence, the participant must be able to:

- Quote preventive measures and organising first aid.
- Describe an accident situation and identifying problems following poisoning.
- List the priority first aid measures to be taken.
- Name the types of interventions carried out by the first aid centre following acute poisoning.

### KEY MESSAGES

#### 1) Assessing hazards and prevention measures

- The employer must, first of all, identify probable and foreseeable hazards by an assessment of the chemical dangers, as well as those of a mechanical and electrical nature. The employer will then be able to plan how to organise first aid and administer initial care.
- An employer whose activities are high risk should:
  - Have adequate equipment for first-aid treatments (first aid kits, clean water, soap, etc.). This equipment will depend on the type of danger to which workers are exposed, the number of workers, etc.
  - Have First aiders (persons trained to administer first aid to workers).
  - Inform all workers about hazards linked to their job and about first aid measures in case of an accident.

#### 2) What to do in case of an acute poisoning?

- The essential first step is to assess the situation and make a diagnosis of the incident based on the symptoms, responses obtained and observation of the scene. In cases of acute poisoning, symptoms such as nausea, headaches, fatigue and weakness may appear quickly. These symptoms depend on each product and the absorption route. The Safety Data Sheet (SDS) for plant protection products is an indispensable tool that contains data on the properties of a chemical. The SDS is a key element for health and safety at the workplace.
- Based on the information collected, the first aider will administer first aid in the following order of priority:
  - Stop any contamination,
  - Keep the person breathing,
  - If the victim is bleeding, staunch the flow,
  - Take care of any eye damage,
  - Contact the emergency services.





# LEAFLET 7

## Investigating accidents and determining the causes

### EDUCATIONAL OBJECTIVES

On completion of this training sequence, the participant must be able to:

- Define the concept of accident.
- Cite the three steps of the “causal tree method”.
- Name the 6 indicators of the “information gathering” step.
- List the rules for construction of the causal tree.
- Explain how to implement the three phases of the causal tree method.

### KEY MESSAGES

#### 1) Definition of an accident

- An accident is an unforeseen event that results in body injury or damage to property or the environment.
- It occurs because at least one hazardous object or activity is present, one for which the action scenarios implemented contained a risk that was insufficiently controlled.

#### 2) Analysing accidents and unwanted events (causal tree method)

- Accident analysis is a source of information and an opportunity for the company to improve its practices.
- The “Causal Tree” approach has 3 phases:
  - Gathering information: this phase requires a study of the facts and also interviews and discussions with the people concerned. The study is based on 6 indicators:
    - a) Technology (equipment and procedures),
    - b) Organisation (roles and responsibilities, legislation, work management, etc.),
    - c) Environment (weather, natural effects, etc.),
    - d) Staff (attitudes and behaviour, skills and training, communication),
    - e) Similar events,
    - f) Time/Sequence: this is a question of referring to information in the five indicators above to consider what changed over time.
  - The causal tree generally focuses on representing the whole combined set of causes of a failure scenario, in particular in order to:
    - a) Explain the failure that has occurred,
    - b) Be able to take relevant correction/prevention measures.

These measures, taken at management system level, will result in improved practices by reducing the number and seriousness of accidents in the future.

- A Causal Tree uses two symbols to represent an event: a rectangle or a circle to represent a normal or unusual event. Events are linked together by lines that express the

cause-effect relationship.

**PERSONAL NOTES AND REFERENCE MATERIAL**

A series of horizontal dotted lines for writing notes and reference material.



# LEAFLET 8

## Storing plant protection products safely and in conformity

### EDUCATIONAL OBJECTIVES

On completion of this training sequence, the participant must be able to:

- Define the construction rules for a plant protection product storeroom.
- Name the general rules for laying out a storeroom.
- List the general rules for managing and organising stocks of plant protection products.

### KEY MESSAGES

#### 1) The general rules to follow

- Plant protection products are toxic and occasionally flammable. They must be stored in a safe place.
- For effective and non-hazardous storage of plant protection products, in compliance with legal or other requirements, it is important to evaluate the risks carefully (health, safety, environment, theft, deterioration). On this basis a suitable storeroom can be built and an effective product management system can be implemented.

#### 2) The storeroom

- It is built based on a set of rules, such as:
  - The storeroom should be located far from living quarters (houses, schools, etc.),
  - The storeroom walls and floor must be made from material that is impermeable and solid,
  - There must be a way to retain spills of all kinds,
  - The storeroom must be well ventilated.
- Its layout will also be based on rules such as:
  - The offices and restrooms must be separated from the storeroom,
  - The products must be stored on steel shelves,
  - Inside the storeroom there must be a sufficient amount of absorbent materials,
  - A free area is needed for the storekeeper to move around, etc.

#### 3) Managing stocks

Safe and orderly storage requires:

- Keeping a regular inventory of the stocks;
- Sorting these products according to their use and their form;
- Creating a goods storage plan;
- Supervising access to the store (keep any unauthorised person from entering). A series of safety measures must be taken, such as a keeping the number of doors to the minimum,





# LEAFLET 9

## General organisation for the transport of plant protection products

### EDUCATIONAL OBJECTIVES

On completion of this training sequence, the participant must be able to:

- List the precautions to take when transporting plant health products.
- Name the criteria for selecting a carrier capable of transporting plant protection products.

### KEY MESSAGES

#### 1) The Regulations

- Road transport of dangerous materials is regulated in Europe by a regulation entitled the “European Agreement concerning the International Carriage of Dangerous Goods by Road” (known as the “ADR” Regulation).
- Each substance considered as dangerous is classified in the ADR according to the risk it represents. Each of the classes corresponds to a specific marking on the vehicle.

#### 2) Precautions to take when transporting plant health products

- Check the packages and their identification with marking/labelling,
- Pay attention to the choice of carrier. The choice must be based on:
  - its know-how and capabilities to handle and transport dangerous products safely;
  - its training level, including good loading and unloading practices, such as pre-inspection, loading time, isolation, unloading inspection, etc.
  - its compliance with regulatory requirements, such as a customised vehicle with a separate compartment;
  - the drivers must be informed about the risks and emergency measures in case of an accident: Immediate response, first aid, accident management, cleaning and decontamination.
- The carrier must have safety equipment and protective clothing.
- The drivers must receive instructions.

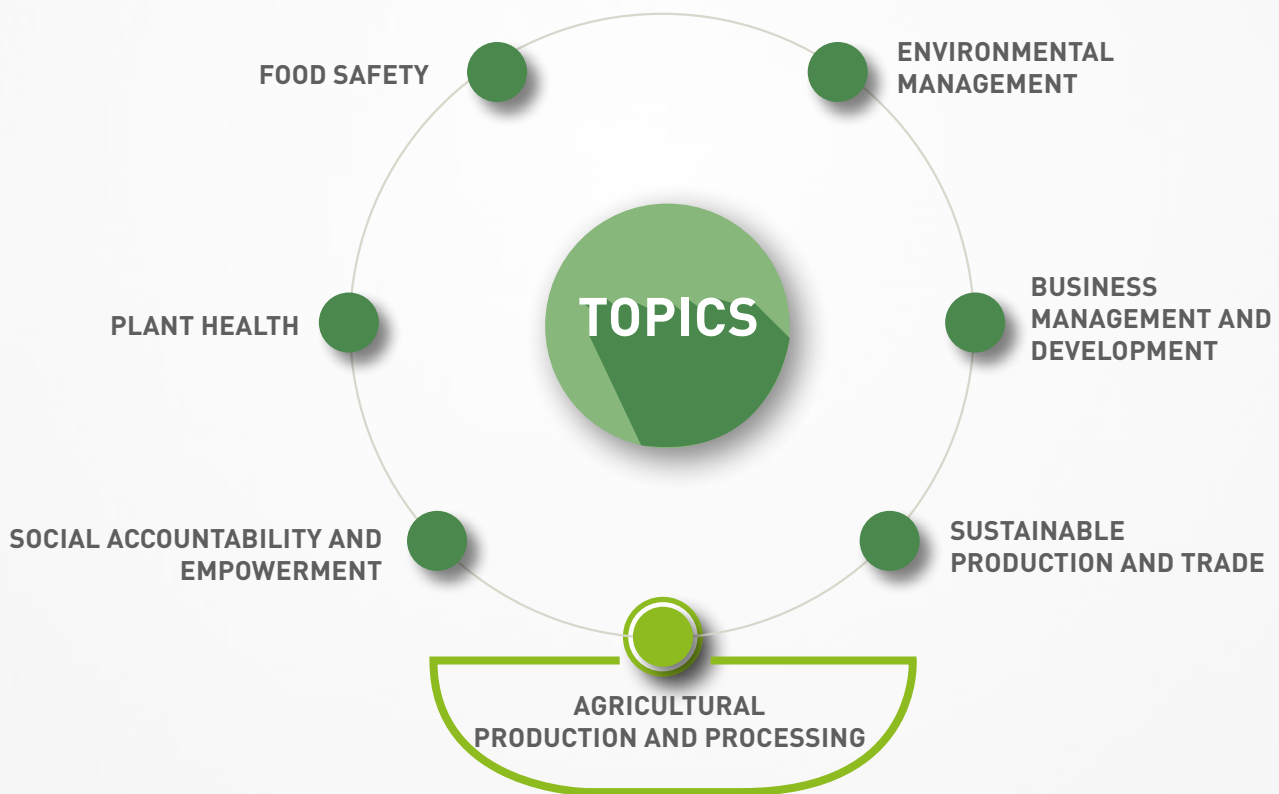




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