



Food and Agriculture
Organization of the
United Nations



World Health
Organization

International Code of Conduct on Pesticide Management

Guidance on good labelling practice for pesticides (Second revision)



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on Pesticide Management**

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for pesticides
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Food and Agriculture Organization of the United Nations

World Health Organization

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Foreword

This document provides guidance on defining or revising national pesticide labelling requirements and on reviewing the design and content of pesticide labels. The guidance is designed for use primarily by government pesticide regulatory and registration authorities in low- and middle-income countries but may also be useful for the pesticide industry, nongovernmental organizations and other relevant entities in writing, evaluating or understanding pesticide labels. After a review of the main objectives and considerations with respect to pesticide labelling and a brief introduction to the Globally Harmonised System of Classification and Labelling of Chemicals (GHS), the document provides practical information on all the elements that appear on a pesticide label, including the design, style and content. It also discusses hazard or risk classifications of a product and underlines the importance of providing complementary information and training.

The guidance was prepared in compliance with the **FAO/WHO International Code of Conduct on Pesticide Management**, which sets out a framework and voluntary standards of conduct for pesticide management stakeholders, in particular governments and the pesticide industry. Endorsed by FAO, WHO, governments, pesticide producers, nongovernmental organizations and other stakeholders, the Code of Conduct outlines their shared responsibility to promote best practice and risk reduction throughout the pesticide life cycle. The Code of Conduct thereby establishes the commitment and moral obligation of stakeholders to comply with the agreed standards of conduct and to assume their respective responsibilities. These include governments' responsibility to promote pesticide risk reduction and the industry's responsibility to produce products that are adapted to the context of their use and to provide stewardship of those products throughout their life cycle.

This guidance was prepared with the support of the [FAO/WHO Joint Meeting on Pesticide Management](#) (JMPM) to provide further guidance on the provisions of the Code of Conduct that are related to pesticide labelling. It reflects the joint FAO/WHO approach to pesticide management, thus addressing labelling in both agricultural and public health settings. An overview of the most relevant provisions of the Code of Conduct related to pesticide labelling is given in section 1.5.

FAO and WHO welcome readers' feedback

FAO and WHO consider this guidance to be a living document, which could be improved. They would therefore value any feedback from readers and welcome comments. They would also value examples of how the guidance is used.

Please send your suggestions, comments and examples to pesticide-management@fao.org, indicating the title of the guidance and the relevant section and page.

Abbreviations and acronyms

a.i.	active ingredient
cfu	colony forming unit
CMR	carcinogenicity, mutagenicity and/or reproductive toxicity
FAO	Food and Agriculture Organization of the United Nations
g	gram
GAP	Good Agricultural Practice
GHS	Globally Harmonised System of Classification and Labelling of Chemicals
GIFAP	Groupement International des Associations Nationales des Fabricants de Produits Agrochimiques (now CropLife International)
IPM	Integrated Pest Management
ISO	International Standards Organization
ITU	International Toxic Unit
IUPAC	International Union of Pure and Applied Chemistry
IVM	Integrated Vector Management
kg	kilogram
L	litre
LLIN	Long-Lasting Insecticidal Net
LMIC	low- and middle-income countries
mg	milligram
MOA	Mode of Action
OECD	Organisation for Economic Co-operation and Development
PPE	Personal Protective Equipment
pt	point
QR	Quick Response (code)
SDS	Safety Data Sheet (formerly MSDS)
UN	United Nations
WHO	World Health Organization
w/v	weight / volume
w/w	weight / weight

Definitions

Application rate: amount of active substance applied per unit (e.g., ha, kg, etc). A pesticide application rate for a measured area is the amount of pesticide to be applied per m² or hectare of spray area.

Colour band: a band printed on the bottom part of a label of a colour indicating the acute and/or chronic hazard of the pesticide product.

Hazard statement: a statement assigned to a hazard class and category that describes the nature of the hazard of a pesticide, including, where appropriate, the degree of hazard.

Leaflet: part of a product label that is supplied in the form of a detachable or separate sheet(s), booklet(s) or similar, rather than attached permanently to the container.

Pictogram: a graphical composition that may include a symbol and other graphic elements, such as a border, background pattern or colour, intended to convey specific information.

Precautionary statement: a phrase (and or/pictogram) that describes recommended measures that should be taken to minimize or prevent adverse effects resulting from exposure to a pesticide, or improper storage or handling of a pesticide.

Release date: the date from which the supplier guarantees a shelf-life of at least 2 years, unless stated otherwise, under actual conditions of storage in the area where the technical grade active ingredient or formulation is to be marketed.

Signal word: a word used to indicate the relative level of severity of a hazard and alert the reader to a potential hazard on the label.

Symbol: graphical element intended to convey information succinctly.

All other definitions below are from Article 2 of the International Code of Conduct on Pesticide Management [1], unless otherwise indicated, as they represent the international consensus on terminology for pesticide management.

Active ingredient: the part of the product that provides the pesticidal action.

Biological pesticide (or biopesticide): a generic term generally applied to a substance derived from nature, such as a microorganism or botanical or semiochemical, that may be formulated and applied in a manner similar to a conventional chemical pesticide and that is normally used for short-term pest control [2].

Co-formulant: a non-active ingredient component of a formulated product.

Container: any object used to hold a pesticide product.

Distribution: the process by which pesticides are supplied through trade channels to local or international markets.

Formulation: the combination of various ingredients designed to render the product useful and effective for the purpose claimed and for the envisaged mode of application.

Good Agricultural Practice (GAP) in the use of pesticides includes the officially recommended or nationally authorized uses of pesticides under actual conditions necessary for effective and reliable pest control. It encompasses a range of levels of pesticide applications up to the highest authorized use, applied in a manner which leaves a residue which is the smallest amount practicable.

Hazard: the inherent property of a substance, agent or situation having the potential to cause undesirable consequences (e.g. properties that can cause adverse effects or damage to health, the environment or property).

Integrated Pest Management (IPM): the careful consideration of all available pest control techniques and subsequent integration of appropriate measures that discourage the development of pest populations and keep pesticides and other interventions to levels that are economically justified and reduce or minimize risks to human and animal health and/or the environment. IPM emphasizes the growth of a healthy crop with the least possible disruption to agro-ecosystems and encourages natural pest control mechanisms.

Integrated Vector Management (IVM): the rational decision-making process for the optimal use of resources for disease vector control. It aims to improve efficacy, cost-effectiveness, ecological soundness and sustainability of disease vector control interventions for control of vector-borne diseases.

Label and labelling: the written, printed or graphic matter on, or attached to, the pesticide or the immediate container thereof and also to the outside container or wrapper of the retail package of the pesticide.

Manufacturer: a corporation or other entity in the public or private sector (including an individual) engaged in the business or function (whether directly or through an agent or entity controlled by or under contract with it) of manufacturing a pesticide active ingredient or preparing its formulation or product.

Mode of Action (MOA): the biochemical process by which a pesticide disrupts normal pest biology usually resulting in the death of the pest. Normally this is a target binding site or a key biological process [3].

Packaging: the container together with the protective wrapping used to carry pesticide products via wholesale or retail distribution to users.

Pesticide: any substance, or mixture of substances of chemical or biological ingredients intended for repelling, destroying or controlling any pest, or regulating plant growth.

Pesticide industry: all those organizations and individuals engaged in manufacturing, formulating or marketing pesticides and pesticide products [4].

Pesticide legislation: refers to legal instruments specifically designed to control pesticides. The term pesticide legislation may refer to a primary instrument, often a law, act or ordinance, to secondary or subsidiary legal instruments, such as regulations, decrees, rules or notices or to both [5].

Product (or pesticide product): the formulated product (pesticide active ingredient(s) and co-formulants), in the form in which it is packaged and sold.

Risk: the probability and severity of an adverse health or environmental effect occurring as a function of a hazard and the likelihood and the extent of exposure to a pesticide.

Toxicity: a physiological or biological property which determines the capacity of a chemical to do harm or produce injury to a living organism by other than mechanical means.

1. Introduction

1.1 About this guidance

1.1.1 *Previous versions of this guidance*

FAO first published the *Guidelines on Good Labelling Practice for Pesticides* in 1985 [6]. In 1988, an addendum was published that introduced the now widely used pictograms for pesticide labels, developed by the Groupement International des Associations Nationales des Fabricants de Produits Agrochimiques (GIFAP), now CropLife International, in close collaboration with FAO [7, 8]. A complete revision of the guidelines subsequently was issued in 1995 [9].

Since then, there have been considerable developments in pesticide and chemicals management which affect pesticide labelling. The *International Code of Conduct on the Distribution and Use of Pesticides* was revised in 2002, and again in 2013 when it was renamed as the *International Code of Conduct on Pesticide Management* [1] (hereinafter the Code of Conduct). Of particular importance for labelling of chemicals was the publication, in 2003, of the *Globally Harmonised System of Classification and Labelling of Chemicals* (GHS) [10].

The labelling of public health pesticides raises specific questions for label content and design [11]. An international seminar held by the Organisation for Economic Co-operation and Development (OECD) in 2005 underlined the importance of good labelling to reduce the risk posed by pesticides. It discussed a number of problems that still occur in pesticide labels and identified options for improvement [12].

Various studies have been carried out over the past two-three decades to assess the effectiveness and understanding of labels on pesticides or chemicals, both in industrialized countries [e.g. 13 – 17] and in low- and middle-income countries (LMIC) [e.g. 18 – 22]. The results of such studies were reviewed and, when relevant and possible, their recommendations have been taken into account in this document. Recent labelling regulations and guidance by major national regulatory authorities were also considered [e.g. 23–30], as well as the views of the pesticide industry [31].

In 2015, a revised version of the *Guidelines on Good Labelling Practice for Pesticides* [32] was published and brought in line with the GHS. Where the GHS allows for (national) interpretation of its provisions, these guidelines provide options relevant to pesticide labelling. It should be noted that the GHS also covers chronic effects that should be addressed in labelling.

1.1.2 *Objectives of this revised guidance*

This revised guidance updates and complements the 2015 revised guidelines (now called “guidance”). This revision was necessary for several reasons. In particular, the guidance now further stresses the importance of using the GHS for pesticide labelling. Importantly, it also adjusts the recommendations for the colour band scheme to i) add severe chronic human health toxicity so that both acute and severe chronic toxicity are reflected (see section 4.7) and ii) replace the green colour by grey. Last, it now includes a new section (see section 3.5) on labelling biological pesticides.

1.1.3 Target audience

This guidance is meant primarily for pesticide regulatory authorities, in particular in LMIC, in defining or revising national pesticide labelling requirements. It is also intended to assist pesticide registration authorities in reviewing the design and content of (draft) pesticide labels. Other stakeholders, such as the pesticide industry and civil society groups, may also find the guidance useful for writing or evaluating pesticide labels.

1.1.4 Structure of this guidance

The document comprises six chapters and eight annexes. The first chapter identifies the objectives and considerations with respect to pesticide labelling. The second briefly introduces the GHS. The third specifies the information that should or may appear on a label. The fourth chapter describes label design, style and content. The fifth discusses hazard or risk classifications for a product, and the sixth underlines the importance of providing information and training. The annexes provide *inter alia* examples of label statements, hazard colour bands and precautionary pictograms for clarifying the general text of labels.

1.2 Scope

This guidance covers the labelling of all pesticides, as defined in the Code of Conduct, in any form destined to be applied by end-users, except pesticides used as human pharmaceuticals.

The guidance does not concern the labelling of pesticides in industrial settings, i.e. active ingredients, bulk pesticide formulations destined for reformulation, repackaging or disposal, or other pesticide formulation components. As these pesticides or pesticide components are not intended for direct use but are generally considered industrial chemicals, it is recommended that classification and labelling of these compounds follow the GHS [10]. Similarly, the content and layout of safety data sheets (SDS) that may accompany pesticide shipments or consignments should follow the provisions of the GHS. However, the registrant must ensure that the SDS that accompanies a product is not inconsistent with the approved label.

Furthermore, the United Nations Recommendations on the Transport of Dangerous Goods – Model Regulations [33] provide specific guidance on labelling and marking for transporting pesticides.

1.3 What is a label?

The Code of Conduct defines a pesticide label as

the written, printed or graphic matter on, or attached to, the pesticide or the immediate container thereof and also to the outside container or wrapper of the retail package of the pesticide [1].

The GHS defines a label in a similar way, as

an appropriate group of written, printed or graphic information elements concerning a hazardous product, selected as relevant to the target sector(s), that is affixed to, printed on, or attached to the immediate container of a hazardous product, or to the outside packaging of a hazardous product [10].

For the purpose of this guidance, the first definition applies.

A label is a mandatory part of the product package. Additional information may be provided by means of a SDS and/or a separate or “fold-out” leaflet that accompanies a container, which should be referred to on the label.

1.4 Purpose of a pesticide label

Labels are the principal, and sometimes the only, contact between the manufacturer or supplier and the user of the product. They convey essential recommendations for use and safety information.

The label is the main source of information on the identity and directions for use of a pesticide, i.e. for what purpose and when and how it may be used. It may also state who is allowed use the pesticide.

In addition, the label informs the user about the hazards of the pesticide and the risks of using it, which should help the user to assess the actual risk of handling and applying the product under specific local conditions. The label is thus an important tool to protect human health and the environment.

In many countries, pesticide labels are legal documents in that they are required by law to be put on a pesticide package. Generally, the (minimum) content and format of the label are also defined by law. In such cases, all pesticide labels, and any modifications or variations, must be approved by the responsible authority. As a result, pesticide labels are enforceable and it is a legal violation to use a pesticide product in a manner inconsistent with its labelling.

1.5 Responsibilities regarding labelling

The Code of Conduct lists the responsibilities and standards of conduct for both governments and the pesticide industry, with respect to pesticide labelling [1]. In general terms, the Code stipulates that:

Governments and industry should ensure that all pesticides made available to the general public are packaged and labelled in a manner which is consistent with FAO/WHO or other relevant guidelines on packaging and labelling and with appropriate national or regional regulations (Article 7.4)

and

All pesticide containers should be clearly labelled in line with relevant regulations or GHS and/or FAO/WHO guidelines on good labelling practice for pesticides (Article 10.1).

The pesticide industry is addressed in various parts of the Code to ensure proper labelling of the pesticides they sell and distribute nationally and internationally:

Pesticide industry and traders should observe the following practices in pesticide management, in particular in those countries that have not yet established or are unable to effectively operate adequate regulatory schemes and advisory services:

- *supply only pesticides of adequate quality, packaged and **labelled** as appropriate for each specific market (Article 3.5.1);*

- *pay special attention to the choice of pesticide formulations and to presentation, packaging and **labelling** in order to minimize risks to users, the public and the environment (Article 3.5.3);*
- *retain an active interest in following their products through their entire life-cycle, keeping track of major uses and the occurrence of any problems arising from the use of their products, as a basis for determining the need for changes in **labelling**, directions for use, packaging, formulation or product availability (Article 3.5.6).*

Even when a control scheme is in operation, the pesticide industry should make every reasonable effort to reduce the risks posed by pesticides by: *using clear and concise **labelling** (Article 5.2.4.7).*

*Pesticide industry should take all necessary steps to ensure that pesticides traded internationally conform at least to principles embodied in GHS and relevant FAO, and/or WHO guidelines on classification and **labelling** (Article 8.2.1.3).*

Of a more technical nature, the Code of Conduct furthermore stipulates that:

*Pesticide industry should ensure that the proposed use, **label claims and directions**, packages, safety data sheets, technical literature and advertising truly reflect the outcome of these scientific tests and assessments (Article 4.1.4)*

and that:

*Industry should use **labels** that:*

- *comply with registration requirements and include recommendations consistent with those of the relevant authorities in the country of sale (Article 10.2.1);*
- *include appropriate symbols and pictograms whenever possible, with their signal words or hazard and risk phrases, in addition to written instructions, warnings and precautions in the appropriate language or languages (Article 10.2.2);*
- *comply with national labelling requirements or, in the absence of more detailed national standards, with the GHS, the FAO/WHO guidance on pesticide labelling, and other relevant international labelling requirements (Article 10.2.3);*
- *include, in the appropriate language or languages, a warning against the reuse of containers and instructions for decontamination and the safe disposal of used containers (Article 10.2.4);*
- *identify each lot or batch of the product in numbers or letters that can be understood without the need for additional code references (Article 10.2.5);*
- *clearly show the release date (month and year) of the lot or batch, expiry date (as appropriate) and contain relevant information on the storage stability of the product (Article 10.2.6).*

1.6 The importance of clear and accurate labels

The appeal to the user to "read the label" will be successful only if the essential messages on the label are as simple and direct as possible. If a label is too complex, too technical or badly laid out, the product may not be used correctly and the user and non-target organisms may be exposed to unnecessary risks. Clear directions and warnings that can be readily understood by all potential users are therefore essential.

The basic regulations affecting label content are national regulatory requirements. There are additional standards within individual companies, as well as international standards, the most important of which are the GHS and the Code of Conduct. Labels must comply with national regulations and conform to relevant international standards.

In countries where various types of pesticides (e.g. agricultural, veterinary, public health, domestic) are regulated by different authorities, there should be effective intersectional information exchange to ensure that the labels used in the country are harmonized and to avoid confusion among pesticide users. Ideally, the label is the outcome of research on the part of the pesticide industry and of evaluation on the part of government regulatory agencies with respect to clarity and effectiveness.

1.7 Comprehensibility and comprehensiveness of label content

Most pesticides are manufactured to be sold and used in several different countries. When label or label elements are used in several countries, they must be accurately translated. Registration requirements should require the use of official, locally understood language(s) and prohibit the placing on the market of pesticides labelled in a non-official language.

Even if a label is in the right language(s), a considerable number of users will be unable to read it, in particular in (but not only) LMIC. For these users, pictograms showing the proper handling or application and the use of protective clothing during application are essential. Pictograms must nevertheless be designed with care to ensure that they are properly understood. It is recommended that information on the meaning of pictograms, symbols, and colour bands be made available at the points of sale (see example in Annex 5).

The increased demand for more information on how to use pesticides correctly, and the need for several languages, with hazard symbols and pictograms on labels, creates competition for space in label design. The five principles to which labels must adhere to the five “C”s: clarity, completeness, comprehensiveness, conformity and consistency.

Clarity is achieved by avoiding complex or excessively technical explanations and by using a clear layout with prominent display of key words, phrases, symbols, and pictograms. The labels should:

- attract users’ attention;
- tell the users what they need to know in brief, precise terms;
- bear locally familiar expressions and symbols; and
- avoid ambiguous statements.

Completeness is ensured by using a checklist of all the essential information, so that no important information or advice is omitted.

Comprehensiveness is achieved by providing training and information on the meaning of pictograms, colour codes and other label elements and how to read a label, and by conducting user surveys, which may result in better labels.

Conformity is achieved by adhering to national, regional and international regulations, standards and guidelines.

Consistency is assured by standardization of label components, such as hazard statements and precautionary texts, so that the texts and layout of different labels are as similar as possible within regulatory requirements and user needs.

Designing pesticide labels that observe these principles cannot assure compliance but can increase the likelihood that the warnings and recommendations on the label will be noticed, read, understood and

followed.

A conflict may arise between the wording required by regulatory authorities and the clear instructions to pesticide users. Regulatory authorities, however, generally accept statements that are easier to read, especially if they are consulted during preparation of a label.

The writer of the label has a responsibility to:

- the user, who must be able to read and understand the label;
- the public and the environment, to protect both public health and the environment; and
- the law, to comply with pertinent regulations.

Labels should have physical durability. They should be resistant to the normal wear and tear encountered in transport, storage and use. These requirements apply equally to the print on the label and the material on which the information is printed. Several years of storage may elapse between manufacture and final use of the product. Without a complete and legible label during storage and at the time of final use, a pesticide may present a serious risk.

Lastly, governments should ensure that new pesticide label formats or elements are pilot-tested in the country of proposed use before their use. This will promote better understanding and raise issues that should be addressed before the labels are put on pesticides.

2. The Globally harmonized system of classification and labelling of chemicals (GHS)

2.1 Background

The *Globally harmonized system of classification and labelling of chemicals (GHS)* [10] was first published in 2003. Later that year, the United Nations Economic and Social Council invited governments to take the necessary steps, through appropriate national procedures and/or legislation, to implement the GHS as soon as possible and no later than 2008. It also invited United Nations programmes and the specialized agencies to promote implementation of the GHS and, where relevant, to amend their respective legal international instruments addressing transport safety, work safety, consumer protection or protection of the environment so as to give effect to the GHS through such instruments. The GHS is a voluntary international system, in that it does not impose binding treaty obligations on countries. The GHS is revised on a regular basis; it is referred to as the “purple book”.

The GHS applies to all chemicals and mixtures of chemicals, but excludes pharmaceuticals, food additives, cosmetics and pesticide residues in food. Pesticides are thus included in the GHS, and this guidance recommends that their classification and labelling follow its provisions. Products containing biological organisms are not covered by the GHS.

This revision of the *Guidance on good labelling practice for pesticides* therefore incorporates the main elements of the GHS and provides advice on applying the provisions of the GHS to pesticide labelling.

2.2 Elements of the GHS

The GHS establishes classification criteria for physical, health and environmental hazards, along with associated hazard communication elements, notably pictograms, signal words, and hazard statements for use on labels.

The hazard classification of the GHS refers principally to hazards arising from the intrinsic properties of the pesticide. The GHS is not intended to harmonize risk assessment procedures and risk management decisions; however, it does accept that countries may choose a risk-based approach to classification, in particular for consumer products.

The harmonized elements of the GHS can be seen as a collection of “building blocks” from which to form a regulatory approach. Consistent with this approach, countries are free to determine which of the building blocks to apply. Nevertheless, when a classification system covers elements in the GHS, and implements the GHS, that coverage should be consistent. For example, if the pesticide classification system covers the acute toxicity of a pesticide, it should follow the harmonized classification scheme and the harmonized label elements.

In this guidance, recommendations are given on which building blocks of the GHS are most relevant to pesticide labelling, and how to implement them. The recommendations should be read in conjunction with the current version of the GHS “purple book”, as the authoritative international source for classification and labelling.

3. Label content

The purpose of the label is to provide the user with all the essential information about the product and how to use it safely and effectively.

The exact content of a label is subject primarily to national regulations, harmonized as much as possible with international systems such as the GHS and the *Code of Conduct*. With these regulations in mind, the minimum information on the label should tell the user:

- what is in the container;
- the acute and chronic hazard it represents and associated safety information;
- directions for use, including target pests and crops, and disposal; and
- supplier identification.

There should be clear instructions on the label to read the safety instructions and directions for use before using the pesticide, e.g. the text:

READ THE LABEL BEFORE USE

or

READ ALL SAFETY PRECAUTIONS AND DIRECTIONS FOR USE BEFORE USE

3.1 Information on product content

The following information about the content of the container should appear on all labels:

- a) **Product name**
- b) **Product category** (e.g. herbicide, insecticide, fungicide).
- c) **Type of formulation** – name and code, according to the International Formulation Coding System [34].
- d) **Active ingredient (a.i.) name** (according to ISO) [35] or other locally used common name, or, in the absence of either, the chemical designation of the International Union of Pure and Applied Chemistry (IUPAC) [36].

If the active ingredient is a microbial agent, it is best identified by genus and species (and if appropriate, also by subspecies and/or isolate/strain number).

- e) **Active ingredient (a.i.) content**, which should usually be expressed as "*contains X g a.i. per kg*" (for solids (including mosquito coils), viscous liquids, aerosols or volatile liquids) or "*contains X g a.i. per litre*" (for other liquids). The contents for vaporising mats are expressed as mg/mat.

If the active ingredient is a microbial agent, the content may be expressed as International Toxic Units (ITU) per mg product or as the number of viable units (spores, cells, colony forming units (cfu), etc.) per unit weight or volume of product.

For specific types of pesticides or formulations, other appropriate units for active ingredient content may be applicable (e.g. % w/w or % w/v for certain household pesticides).

- f) Name, identity and concentration of **hazardous co-formulants** (i.e. all substances such as solvents and adjuvants in the formulation that contribute to the classification of the formulated product) (if any). For example, petroleum distillates must be listed and highlighted to ensure effective medical treatment.
- g) **Net contents** of the pack. This should be expressed in metric units (e.g. litre, gram, kilogram, which can be abbreviated to L, g and kg), or in number (e.g. for pheromone dispensers), unless the country does not use or only partly uses, metric units. In such situations, local units should take precedence, but metric units should also be given.
- h) **Batch number**.
- i) **Registration number** (if any).

3.2 Hazard and safety information

The following information should appear on all labels:

- a) **Hazard symbol(s)** (if any) (see section 4.6)
- b) **Signal word** (if any) (see section 4.4)
- c) **Hazard statement(s)** (if any) (see section 4.4)
- d) **Precautionary statements or warnings** (see section 4.5)

The advice to minimize any risks of using the product must include the following:

- General precautionary statements or warnings.

The following statements must appear, as a minimum, on all labels¹:

KEEP LOCKED AWAY AND OUT OF REACH OF CHILDREN

and

WASH AFTER USE

and

DO NOT eat, drink or smoke when using this product

- Product specific precautionary statements or warnings.
- Relevant personal protective equipment (PPE).
- Precautions when handling the concentrate (if applicable)
- Precautions during and after application
- Environmental precautions during and after application
- A warning against reuse of containers

Much of the safety advice may be put on the label in the form of standard precautionary statements

¹ Exceptions may apply, e.g. for long-lasting insecticidal nets

or warnings (see Annex 2, for examples).

e) **Precautionary pictograms**, that reinforce the safety text (see section 4.6).

f) **Hazard colour band**

A hazard colour band may be printed on the lower part of the label to indicate acute toxicity and severe chronic effects, when relevant, of the formulated product (see section 4.7).

g) A **tactile warning** for blind and visually impaired people. The word *PESTICIDE* should be printed in Braille on the labels of all products supplied to the general public. In addition, a tactile warning of danger, in the form of a raised triangle or three raised dots placed in a triangle, is required for pesticide products classified as dangerous that are supplied to the general public (see section 4.8).

h) **First aid and medical advice**

Labels should carry first aid and medical advice, where relevant (see section 4.9). Information on symptoms and antidotes may be added, where appropriate, for some particular products.

The following statement should appear, as a minimum, on all labels:

If medical advice is needed, have the product container or label at hand.

a) **Product or user category**

In some countries, pesticide products are classified by product or user category (e.g., professional use, restricted use, household products - or pesticides also referred to as domestic, consumer or amateur products -, public health pesticides). If that is the case, the appropriate product or user category should appear on the label.

b) **Accidental spills advice**

Instructions for containing and/or cleaning up spills of the pesticide should be provided (see section 4.10).

3.3 Directions for use

Clear directions or instructions for use should appear on the label (see section 4.11). These generally encompass the following elements:

a) **Field of use**

There should be an initial, brief statement on the field of use of the product, e.g.:

For the control of aphids in top fruit

or

For vector control and management of public health pests

or

Kills flies, mosquitos and other flying insects. For use in and around the home

or, in the case of more restricted registrations, e.g.:

FOR USE ONLY as an agricultural seed treatment

b) **Directions for use**

The directions for use on the label must clearly indicate **how**, **when** and **where** the product can be used legally for maximum efficacy and minimum risk. The information may be repeated and/or expanded in a separate or attached leaflet, but the essential instructions must always be displayed on the label.

Practical advice should, where relevant, be included on:

- Where to use the product: crops; target pests/weeds; situations;
- Dose rate(s);
- Mixing instructions and water volumes, where appropriate. Volumes and weights given in mixing instruction should preferably be in the same units as that of the container, to avoid conversion errors);
- Methods of application; incompatibility with specific (equipment) materials, where appropriate;
- When to use the product, including: timing and frequency of application; maximum number of applications per season or year; intervals between applications; and when not to use the product;
- Warnings that different pesticides should not be mixed in one spray solution, except in the case of a registered tank-mix.
- Warnings related to phytotoxicity, susceptible adjacent crops, subsequent crops;
- Other specific conditions or restrictions pertaining to use, such as environmental, agricultural or weather conditions or spray drift;
- Withholding periods and pre-harvest intervals; re-entry intervals; pre-slaughter intervals
- Incompatibility with other products, where appropriate;
- Information on resistance prevention and management, including the mode of action (MOA) code of the pesticide [3], where appropriate (see example of industry guidance on MOA labelling in Annex 7); and
- Instructions for cleaning application equipment and PPE [37].

c) **Storage and disposal**

Recommended storage conditions should be specified on the label. Furthermore, essential information on recycling or disposal of empty containers and left-over pesticides should be provided:

- A warning against reuse of containers, except when refilling is explicitly allowed in the directions for use (this can also be in the hazard and safety section of the label);
- Instruction for storage;
- Instructions for disposal of empty containers (e.g. triple rinsing and puncturing) and left-over pesticide; and
- Contact information (name of organization, telephone number and email address) for handling environmental incidents such as spills.

3.4 Supplier identification

The following information on the supplier should appear on the label:

- a) **Local distributor's or supplier's** name, address, telephone number and email address should always be mentioned on the label. This will often also be the registration holder of the product in the country concerned.
- b) If the **registration holder** and the local distributor or supplier are different, contact details for the registration holder should also appear on the label.
- c) The manufacturer's name and other unique identifiers may appear on the label.

3.5 Labelling of biological products

As stated in the *FAO/WHO Guidelines for the registration of microbial, botanical and semiochemical pest control agents for plant protection and public health uses [2]*, biological control agents have characteristics that distinguish them from chemical pesticides, and the product labels should reflect this.

Description and quantification of the active ingredient (a.i.) in the formulation: the label should provide a description and quantification of the active substance in the formulated product as follows:

- Microbials: the content of the active substance can be expressed, for example, as colony forming units (cfu) per kilogram or litre and/or the amount of relevant secondary compounds (metabolites) or in terms of biopotency (e.g. *Bacillus thuringiensis* is expressed in terms of Billions of International Units, or BIU). The label may also give information on the amounts of other materials such as spent fermentation media.
- Botanicals: the content of the active substance can be expressed as the amount of botanical source material, the lead component, or biopotency.
- Semiochemicals: the content of the active substance is usually expressed as the amounts of each of the active substances or the amount of the combined active substance (e.g. xx g of moth pheromone).

Formulation: details should be provided on the type of formulation.

Safety advice: the label should contain safety advice (and pictograms) for humans and the environment, and on appropriate PPE.

Effectiveness: the label should indicate the expected effect (e.g. pest kill, yield improvement, post-harvest protection) and the expected level of the effect (e.g. pest control, pest reduction, pest suppression, increased yield).

Directions for use: the label should provide advice on how to mix, prepare and apply the product for each target pest and situation, and also on application equipment, water volumes, adjuvants, and conditions under which the product should not be used.

Directions for storage: the label should specify the storage conditions that correspond to the test conditions of the (real-time) storage study and any specific conditions required (e.g. refrigeration).

Integrated pest or vector management: it is good practice for the label to recommend use of the product as part of IPM or IVM and to indicate its compatibility with other control measures (in line with Article 11.2.8 of the Code of Conduct), if known.

Resistance: it is good practice for the label to recommend that products with active substances that have different modes of action be used in rotation to reduce the chance of development of resistance of pests, diseases or weeds. As many biological pest control agents have multiple modes of action, it is reasonable to expect that resistance will develop slowly or not at all.

3.6 Other information

In addition to the contents, hazard and safety information and directions for use discussed above, the following information may also appear on all labels:

- a) **Statutory heading.** In many countries, pesticides can be used legally only according to the label. A statutory heading may be included to state this condition, such as:

Compliance with the following conditions of use is a legal requirement

or

It is a violation of law to use this product in a manner inconsistent with its labelling

- b) The **release date** of the product should always appear on the label.
- c) **Shelf-life** or expiry date, for products with a shelf-life of less than 2 years from the release date.
- d) **Legal responsibility** and/or warranty statement. This is a disclaimer included voluntarily on most pesticide products by the registrant.
- e) A **QR-Code** (Quick Response Code) may be put on the label, which can be read on a smart phone to find further product and risk information (e.g. additional medical advice) on the website of the pesticide company [38]. Information on a company website cannot, however, replace the label information that is legally required by a country.
- f) Contact details of the national or regional **poison centre** or similarly qualified institution.

3.7 Label content and category of product and user

In principle, the contents of the label as listed above apply to all categories of products and users. Therefore, labels on products for restricted use or general use, products intended for use by professionals (e.g. farmers, pest control operators) or amateur users (e.g. in homes and gardens) and products destined for use in agriculture, forestry, disease vector control or in industry) generally have the same elements. The level of detail in which these elements are presented on labels may, however, differ.

Restricted use products are generally among the most hazardous pesticides used in a country, and therefore hazard and safety information as well as directions for use are likely to be extensive. Furthermore, they often have a heading *RESTRICTED USE PESTICIDE* (or similar) printed on the main panel of the label.

Household pesticides, which are bought and used by non-professionals, are generally authorized only if they present a low hazard. As a result, the hazard and safety information will be less substantial and the instructions for use less broad than for professional use products. It is important to use simple language and to avoid jargon and technical language that may be relevant to agricultural users but not comprehensible for household users (for further information on household pesticides, see the

FAO/WHO Guidance on management of household pesticides [39]).

Labels for public health pesticides and agricultural pesticides have similar format and contents, but the directions for use sections are different because of the different target pests and application methods.

Specific label elements, not mentioned in the sections above, may apply for special purpose labels. These are discussed in section 4.14.

4. How to write and review a label

This chapter considers the practical aspects of good, clear label design and layout, how to check labels and the use of pictograms.

4.1 Label layout

4.1.1 *General*

Clear layout of a label contributes greatly to its ease of use and should be carefully considered during design by the pesticide company and evaluation by the registration authority. The label information should be logically structured from the point of view of the user, and his/her attention should be drawn to the essential text. Guidance from a professional designer may be needed when developing label layout. Some principles of successful label layouts are discussed below.

The information on a label is best broken up into smaller, separate sections. Each block of subject matter should have a clearly understood heading. Generally, the following subjects are present on a label (although variations are possible):

- Product identity & field of use
- Signal word, hazard statement(s), hazard symbol(s)
- Precautionary statements
- Directions for use
- Storage and disposal
- First-aid and medical advice
- Advice on dealing with accidental spills

In each section, the information should be structured in the sequence the user requires.

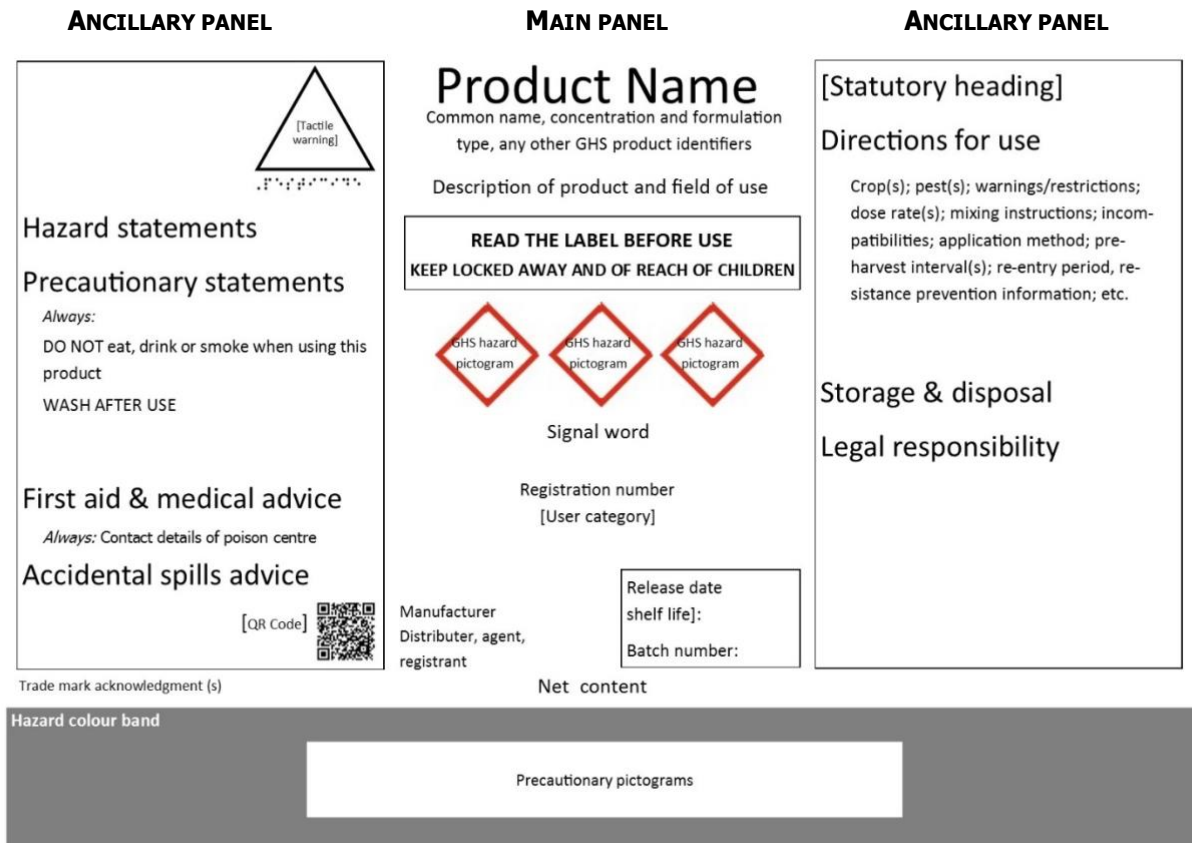
Labels may be laid out in one, two, three or more panels. If the size allows, a three-panel layout is preferred. For smaller packages, the primary or main label panel (see in 4.1.2) may be securely attached to the container, and more detailed information provided in a separate or “pull-off” leaflet.

4.1.2 Three-panel layout

If label size allows, a three-panel layout shown below is suggested. The main panel should identify the product, its field of use and essential warnings and restrictions, while the two other panels can provide directions for use, precautionary statements, storage and disposal provisions, and other information.

An example of a three-panel pesticide label layout, with the suggested location of the different label sections/elements, is provided in Figure 4.1.

Figure 4.1 Example of a three-panel label [optional label elements are shown between square brackets].

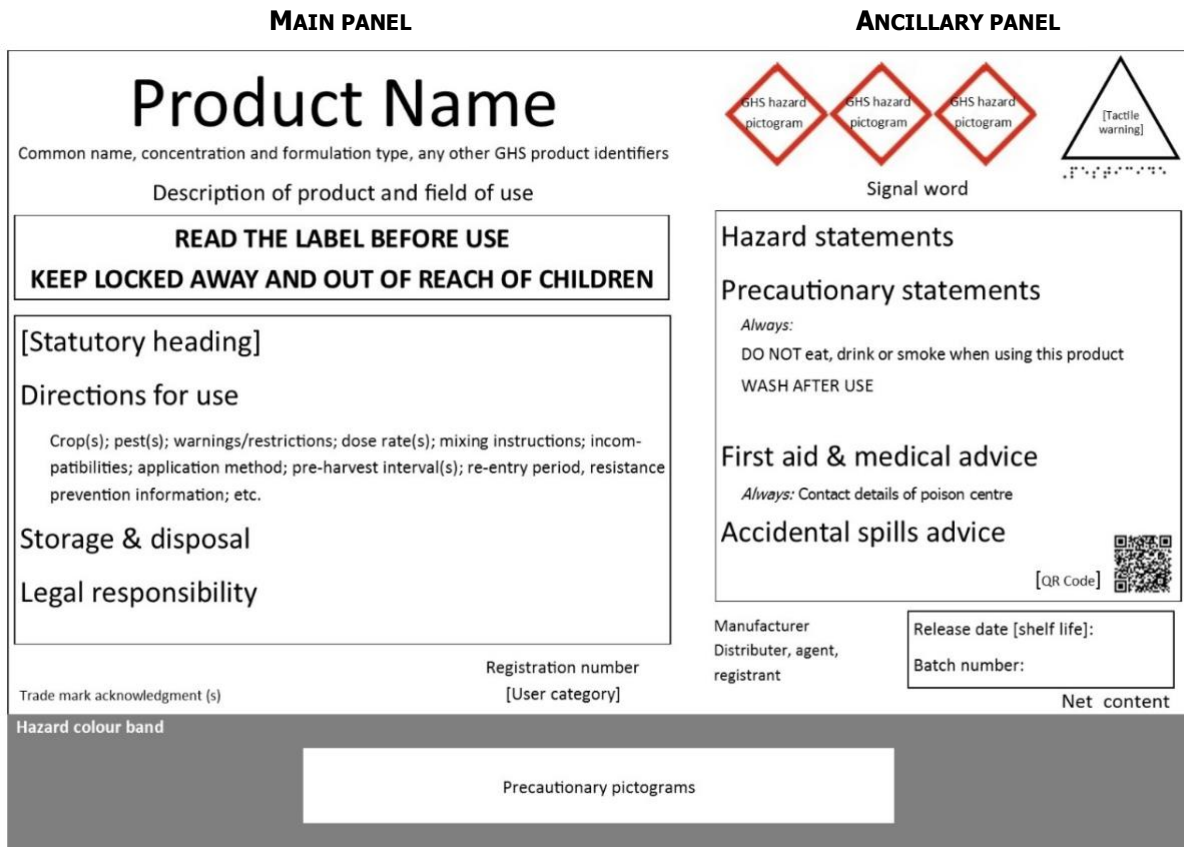


4.1.3 Two-panel layout

In this case, the main panel contains the information necessary to identify the product and its field of use and to provide essential warnings and restrictions. The second (ancillary) panel contains other essential information, such as directions for use, precautionary statements and provisions for storage and disposal.

An example of a two-panel pesticide label layout, with the suggested location of the different label sections and elements, is provided in Figure 4.2.

Figure 4.2 Example of a two-panel label [optional label elements are shown between square brackets].



4.1.4 Single panel layout

A single panel label should be used only if the uses of the product are limited and the directions for use, warnings and precautionary statements and first aid require little detail. It should not be the sole source of information on a small pack size, for which ancillary panels can be printed on a separate extension or attached leaflet (see 4.1.5)

Figure 4.3 Example of a single panel label [optional label elements are shown between square brackets].



4.1.5 Labels for small packs and supplementary leaflets

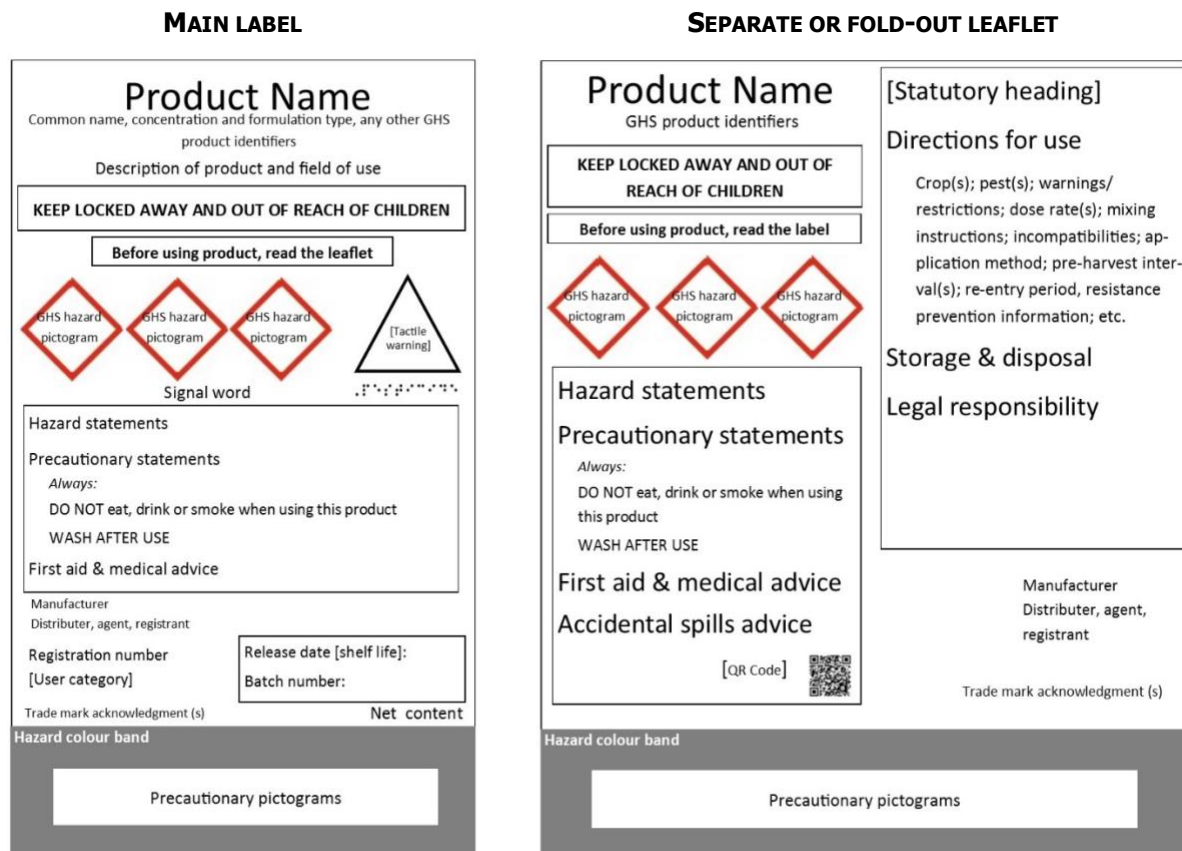
The labelling of small packs designed for smallholders or household users can be problematic because of the limited space available for text. Some hints for reducing text are given in section 4.2.3; however, if local or national regulations permit, information can be printed on a separate leaflet or an attached “fold-out” leaflet, which folds out when pulled off but stays attached to the main label on the packaging.

When using a separate or fold-out leaflet, always ensure that:

- The panel with hazard symbols and statements is on the part of the label that is glued to the pack.
- The label includes the instruction: *Before using product, read the leaflet.*
- If not all the information on the main label is repeated on the leaflet, the following instruction is included: *Before using product, read the label.*
- The fold-out leaflets are firmly attached to product container so that it stays with the product through its sale and use.
- Key information on the label is repeated on the separate or fold-out leaflet.

An example of separation of information on label and packaging leaflets is given in Figure 4.4.

Figure 4.4 Example of a label for small packaging and a separate or “fold-out” leaflet [optional label elements are shown between square brackets].



4.1.6 *Label for pre-measured packs and twin or multi-packs*

When a product is packaged in two or more pre-measured quantities in an outer container (pre-measured packs) or when two or more products are packaged individually and sold as one unit packed together (twin or multi packs), if such packaging is permitted by the responsible authority, additional labelling is required.

The outer container must be fully labelled in accordance with this guidance. For pre-measured packs, the main panel must include the statement: *CONTAINS ... MEASURED PACKS WHICH IT IS ILLEGAL TO SELL SEPARATELY*

For both pre-measured packs and twin or multi packs, the inner packs must be fully labelled, when possible, or be labelled with the essential information specified for the main label of a small package.

Note that the identity and content of the active ingredient, hazardous co-formulants, hazard symbol, signal word and hazard statement of each component should be stated on the respective labels for that component. However, directions for use, precautionary statements and other product identity information are product-specific and apply to all components.

4.1.7 *Dual or multi-language labels*

When the label is required to be printed in more than one language, each language should have its own complete label. The translations must convey the same meanings in each language. Only in extremely rare circumstances will there be sufficient space on a single label for two or more complete sets of information in separate languages. Shortage of space can be overcome by having the container labelled in the primary language and in other languages on an attached leaflet. If possible, key safety information in all the required languages should be on the label firmly attached to the container.

The translated labels should be verified independently, e.g. by “back-translation” to the original language, to check that the meaning is correct.

4.2 **Style and format of text**

4.2.1 *Style and wording*

Labels should provide clear, concise and easy-to-read information for the end-user. The wording should be simple and straightforward and without jargon or needless words. Technical terms should be avoided as much as possible, in particular on labels of household and amateur-use pesticides.

Precautionary statements and warnings on labels should be conspicuous, understandable and easy to comply with. The wording of a label is most effective when it causes action and modifies behaviour: labelling should encourage beneficial behaviour and discourage negative or hazardous behaviour. Examples are:

Label statements discouraging behaviour include:

- *Do not apply when windy*
- *Do not store diluted unlabelled product*
- *Do not apply near water, storm drains or drainage ditches*
- *Do not decant into another container for resale.*

Label statements encouraging behaviour include:

- *Wear gloves with every use*
- *Sweep up spilled product*
- *Keep people away from the spill area*

Label statements may be “mandatory” or “advisory”.

Mandatory statements apply to the actions that must be done to ensure proper use of the pesticide and to prevent the occurrence of adverse effects on human health or the environment. They are regulatory provisions defined and controlled by the registration authority. Mandatory statements include directions for use and precautions to direct the user to take or avoid specific actions. Mandatory statements are generally written in imperative or directive sentences. Examples of mandatory label statements are:

- *Wear chemical-resistant gloves*
- *Do not induce vomiting*
- *Do not apply within 25 metres of wells*
- *Do not apply directly to water*
- *Keep away from heat, sparks and open flame*
- *Do not enter into treated areas for 24 hours*

Advisory statements provide information on how to maximize efficacy and safety while using the product. Such statements are not regulatory requirements. They usually explain the purpose or benefit of doing something, instead of asserting that it must be done. However, advisory statements should not conflict with mandatory statements, and should not be false or misleading, or otherwise violate regulatory provisions.

Advisory statements are best written in descriptive or nondirective terms. Words such as “must”, “should”, “do” or “do not” in advisory statements could lead the product users to erroneously believe that they must comply with the statements, when in fact they are not mandatory. Phrasing advisory statements in straightforward, factual terms minimizes the possibility that they will conflict with mandatory statements.

Examples of advisory statements are:

- *Applying the product immediately after preparation helps to ensure that it is in suspension*
(instead of: *Tank mixtures should be applied immediately after preparation.*)
- *Directing the spray mixture around the base of the cotton plants and using shields on application equipment will help minimize foliage contact and plant injury*
(instead of: *The spray mixture should be directed to the soil around the base of the cotton plants. Care should be taken to prevent the spray from striking the cotton leaves as injury will occur.*)
- *Flushing the sprayer with a detergent solution at the end of the workday will help to ensure a clean sprayer and trouble-free operation*
(instead of: *The sprayer must be thoroughly cleaned by flushing with a detergent solution at the end of each work day, to ensure a clean sprayer and continued trouble-free operation.*)

Proper understanding of pesticide label text depends strongly on national linguistic practice and cultural customs. What works in one language is not necessarily effective in another. Therefore, the effectiveness of pesticide labelling style and wording should be tested and evaluated locally.

4.2.2 *Print size and style*

The following recommendations apply to print size and style on pesticide labels:

- It is recommended that all warnings and precautionary statements be at least 8-point type, and all other text in at least 6-point type. The preferred size is 11-points. Examples of print size and style are given in Annex 1.
- Highlighting in bold is more effective than using capital letters.
- The typeface selected should be very clear, with no decoration or oddities. The print style preferred is Helvetica (European Grotesque) or Modern. Avoid italics, except for Latin names; even these should be avoided when there is a well-known common name.
- Use clear letter separation, not close tracking.
- Leave adequate space between lines of text.
- Avoid vertical or diagonal text.
- Avoid overprinting illustrations, logos or “ghost” pictures as these make text less easy to read.
- Whenever possible, the label should be set out in clearly headed distinct blocks, with deliberate, but not excessive, use of colour for greater impact. Clear space around blocks of statements and symbols also attracts attention.

4.2.3 *Effective use of space*

As space is usually at a premium on most labels, one way of gaining space, and thus enabling use of a larger print size, is to reduce text by avoiding unnecessary information, keeping sentences short and precise, and generally making the text as economical as possible, while retaining all essential information.

Another way of gaining space on labels and attaining the correct print size is to reduce white space (that part of the label on which there is no print). White space is found at the ends of lines, between letters, words, lines and paragraphs, between columns and in borders around the text. Space is necessary around blocks of statements and symbols in many cases, to attract attention to the statement, as indicated above. Nevertheless, with that reservation in mind, some hints for reducing text and white space and thus allowing larger print size are:

- Reduce long sentences and use shorter words, ensuring that the meaning is not lost.
- Remove any non-essential information, such as overly technical descriptions of the activity of a product, or simplify these to a few words.
- Tabulate information on rates of use, volumes, etc.
- Reduce the space between paragraphs, but not between lines.
- Reduce the tracking of less important sentences, e.g. those that are descriptive.
- Use abbreviations if they are certain to be understood.
- Move information to less crowded parts of the label.
- Check relative widths of columns so that paragraphs end nearer the column edge.
- Increase the number of columns. This sometimes allows better use of space at the end of short sentences, e.g. in the safety text.

- Use a separate or integral leaflet.
- When texts are to be translated into another language, remember that some languages take up more space than others.
- Avoid using overstickers to amend label information except when necessary and agreed to by the regulatory authority and the registrant. When stickers are used they must not cover other valid aspects of the label.

4.3 Use of colour

Red is a generally accepted warning colour and should be used only for hazard symbol pictograms (in line with the GHS), the hazard colour band or safety advice headings. The colour of the label should be such that the hazard symbol pictogram stands out clearly.

For best contrast and easy reading, the text on labels should be mainly black on a plain white background.

On leaflets and brochures, colour generally enhances attractiveness. Showing objects in their true colours will increase understanding. Important parts of drawings can be emphasized by contrasting colours. Be beware, however, that too many or too intense, colours can distract from the intended message.

Colour contrast is just as important as the colour itself. Thus, red should always be on a white background and never on other colours, such as yellow.

To maintain contrast, use strong colours on a neutral contrasting background, e.g.:

- black on white
- black on yellow
- red on white
- green on white
- white on blue
- grey on white

Colour may also be used for the hazard colour bands placed on the label to indicate the acute toxicity and severe chronic toxicity, when relevant, of the product. These are discussed in more detail in section 4.7. These colours must stand out clearly from the rest of the label colour.

4.4 Signal words and hazard statements

All labels should have the appropriate signal word and hazard statement, according to its hazard classification. Use of the GHS harmonized signal words and hazard statements is recommended.

A **signal word** is a word used to indicate the relative level of severity of hazard and alert the reader to the information on the potential hazard on the label. The signal words used in the GHS are *DANGER* and *WARNING*. *DANGER* is used for more severe categories and *WARNING* for less severe categories.

The signal words used for the WHO classification [40] are *VERY TOXIC*, *TOXIC*, *HARMFUL* and *CAUTION*, which are different from those used in the GHS. If the WHO classification is used as a basis

for hazard classification, these signal words should be used, and not those stipulated by the GHS.

A **hazard statement** is a phrase assigned to a hazard class and category that describes the nature of the hazards of a pesticide product, including, where appropriate, the degree of hazard.

More information on hazard classification and the assignment of signal words and hazard statements for pesticide labels is provided in chapter 5. The required hazard statements and signal words for different hazard categories, according to the GHS, can be found in the GHS “purple book” [10].

If after classification, more than one signal word is required for human health, precedence for their allocation may apply. For instance, if the signal word *DANGER* applies, *WARNING* should not appear on the label. Precedence does not apply for physical hazards and all relevant signal words apply. Further advice on the precedence for signal words is given in the GHS [10].

The applicable hazard statements should all appear on the label.

Whenever possible, the hazard statement and hazard symbol should be placed close together on the label to help explain the meaning of the symbol.

4.5 Precautionary statements and warnings

A **precautionary statement** is a phrase that describes the measures to be taken to minimize or prevent adverse effects resulting from exposure to a pesticide, or its improper handling, application or storage. Precautionary statements can be based on hazard or risk. They should appear with the hazard communication elements discussed above (hazard symbol, signal word and hazard statement).

Precautionary statements are not internationally harmonized, and many countries have national legal requirements that define such statements. In such cases, relevant national legislation should always be followed. The term “warning” or “safety phrase”, used in some regulatory systems, is similar to the term “precautionary statement” in the GHS.

In the absence of national requirements, or supplementary to them, the GHS provides suggested precautionary statements according to the identified hazard category [10]. The GHS identifies four types of precautionary statement covering:

- prevention;
- response;
- storage; and
- disposal.

These may be subdivided into operator, consumer and environmental precautions.

Precautionary statements on the pesticide label should, at a minimum, cover the hazards or risks identified for the pesticide. When possible, the hazard statement and the related precautionary statement should be placed together on the label. For example:

Flammable. Keep away from heat and open flame.

In all cases, the following general precautionary statements should always appear on a pesticide label:

KEEP LOCKED AWAY AND OUT OF REACH OF CHILDREN

WASH AFTER USE

DO NOT eat, drink or smoke when using this product

If PPE is required for using household products or other products supplied to the general public, the related statements on the label should be very explicit.

E.g. *WEAR GLOVES WITH EVERY USE.*

Examples of precautionary statements relevant for pesticide labels are given in Annex 2.

When drafting and evaluating a pesticide label, existing labels for similar products should be checked to ensure that the precautionary statements are consistent, unless existing labels are outdated.

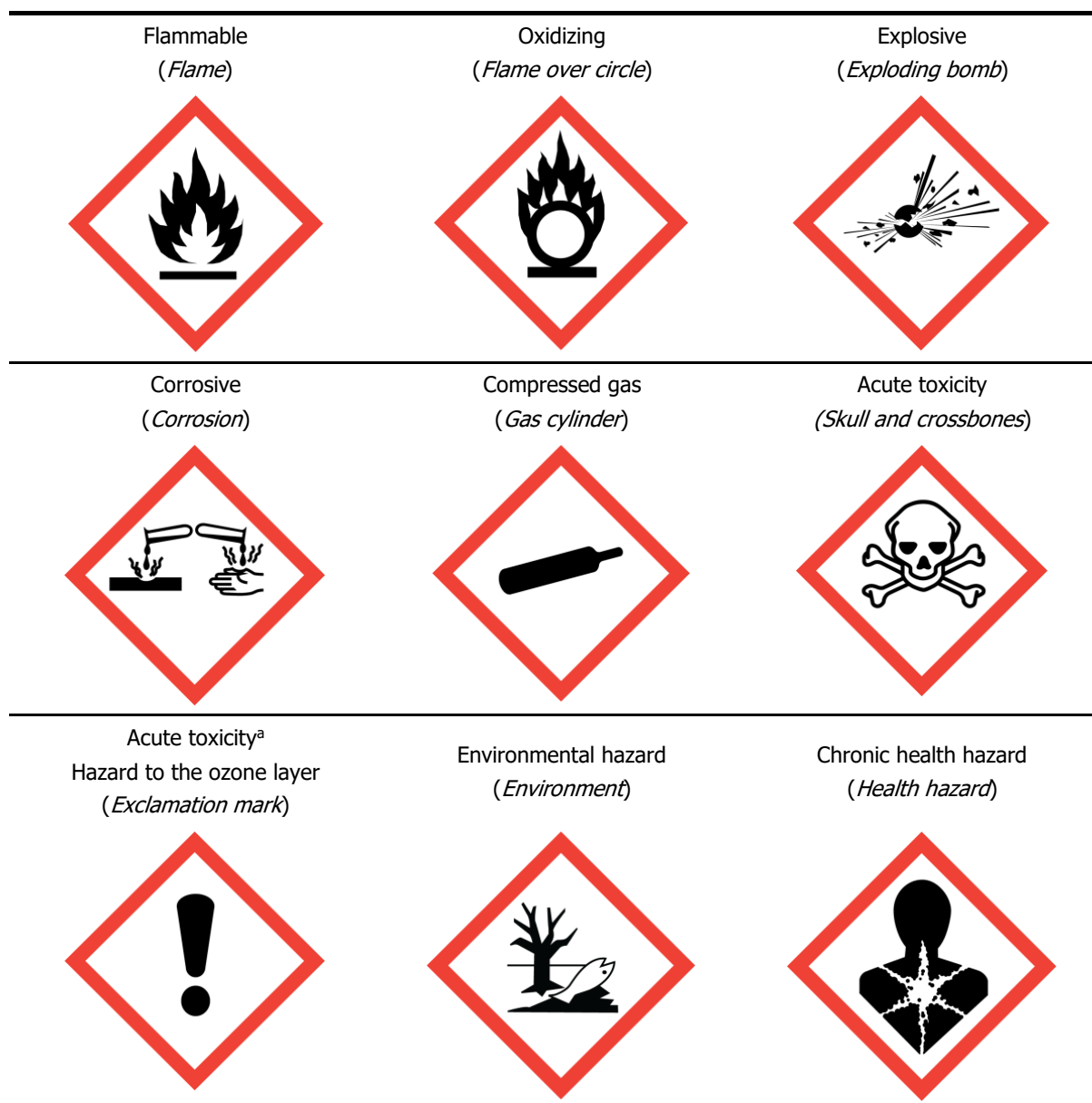
4.6 Use of symbols, pictograms and illustrations

There is usually insufficient space on the label to include any illustrations, except for mandatory or suggested **hazard symbol pictograms** and **precautionary pictograms**. A pictogram is a symbol that conveys a message without the use of words. Other illustrations are best confined to supplementary label leaflets, brochures and posters. Illustrations and pictograms should always be used in combination with the required text, and not replace it.

4.6.1 Hazard symbol pictograms

For the purpose of pesticide labelling, hazard symbol pictograms (or hazard symbols) are those that visualize the hazard (or sometimes risk) of the product, according to the GHS. They are applicable to all chemicals, including pesticides. The following hazard symbols are defined by the GHS. They should be in the shape of a square set at a point, and should have a black symbol on a white background with a red frame (Figure 4.5). The exact size of the hazard symbol pictogram will depend on the size of the pesticide container or label, but must not be less than 10 x 10 mm.

Figure 4.5 Hazard symbols (and their *names*) according to the Globally Harmonized System of Classification and Labelling (GHS)



See also the EU information about the Classification, Labelling and Packaging (CLP) Regulation and pictograms at: <https://echa.europa.eu/regulations/clp/clp-pictograms>

^a The exclamation mark is used for different hazard categories

All the symbols (except the explosive symbol) may be used on pesticide labels. More information on hazard classification and the assignment of hazard symbols for pesticide labels is provided in chapter 5.

Additional hazard symbols may have been defined by national governments (see examples on pollinators in Annex 8). When possible, the signal word, hazard statement and hazard symbol pictogram should be placed close together on the label.

4.6.2 *Precautionary pictograms*

Precautionary pictograms on a pesticide label are visualizations of the main precautions that should be taken when handling, applying or storing a pesticide. They are specifically designed for pesticide products. A standard set of precautionary pictograms for pesticide labels was devised by GIFAP (now CropLife International) in cooperation with FAO [7, 8]. They illustrate recommended measures that should be taken to minimize or prevent adverse effects resulting from handling, applying or storing a pesticide. The aim of the precautionary pictograms in this guidance is to communicate key precautionary information to users in various countries with various levels of literacy. Points to be noted in the use of precautionary pictograms are as follows:

- In some countries, permission from regulatory authorities may be required but, in general, most encourage their use.
- Precautionary pictograms should be introduced into the label during drafting.
- Precautionary pictograms should echo and reinforce precautionary statements. If a precaution appears for which a pictogram exists, that pictogram must also appear.
- Conversely, a precautionary pictogram should never be used unless the precautionary statement carries the corresponding phrase. The overriding principle is that pictograms should relate to the text; they should never contradict it or make it less clear.
- Only the precautionary pictograms recommended below should be used, unless the country has designed pictograms that reflect local culture and practices.
- Precautionary pictograms that should appear on all labels are those that depict washing after use and keeping the product locked away and out of reach of children.

The preferred size for precautionary pictograms is 15 x 15 mm; the minimum 7 x 7 mm.

The most commonly used precautionary pictograms are shown in Figure 4.6. Additional precautionary pictograms other than those defined by FAO may have been developed by national governments or other entities (see examples on pollinators in Annex 8). Further advice on how to use these pictograms on a pesticide label is provided in Annex 4.

4.6.3 *Illustrations*

Illustrations or graphics should not obscure or crowd the required label text. Therefore, most illustrations (other than pictograms) are best confined to supplementary label leaflets, brochures and posters. They can be helpful to show:

- how to open product containers;
- what a pest or disease looks like;
- how to do or not to do something (e.g. diagrams how to open the product container, pictures illustrating proper pesticide use, pictures showing how to triple rinse and puncture an empty container);
- appropriate PPE;
- a sequence of events;
















A bar code may also be printed on the label for scanning of prices in retail stores and/or for the traceability of the product in the country.

Care should be taken to avoid illustrations on the label or on supplementary leaflets, brochures and posters that may misrepresent the product or may be misleading, such as:

- a food, crop or situation pictured on a label that is not approved;

- pictures of people using a product without the required PPE;
- pictures of children playing or pregnant women;
- symbols implying safety or non-toxicity, such as a red cross or a medical seal of approval;
- the Mobius loop (a recycling symbol in the shape of three chasing arrows forming a triangle) or any other symbol on the printed label that implies that the **product** could be recycled when in fact it cannot be. If the packaging can be recycled, it is appropriate for a recycling symbol to be shown in an inconspicuous location on the **container or package** with the word “package” printed near the loop;
- pictures and colour that prevent clear distinction of the hazard toxicity colour band.

Figure 4.6 Precautionary pictograms to reduce risks when handling, applying or storing a pesticide

Type	Pictogram and message		
<p>Storage pictograms</p>	 <p>Keep locked away and out of reach of children</p>		
<p>Activity pictograms</p>	 <p>When handling liquid concentrate ...</p>	 <p>When handling dry concentrate ...</p>	 <p>When applying pesticide...</p>
<p>Advice pictograms</p>	 <p>Wear gloves</p>	 <p>Wear eye protection</p>	 <p>Wear boots</p>
<p>Advice pictograms</p>	 <p>Wear protection over nose and mouth</p>	 <p>Wear respirator</p>	 <p>Wear ear protection</p>
<p>Advice pictograms</p>	 <p>Wear overalls</p>	 <p>Wear apron</p>	 <p>Wash after use</p>
<p>Warning pictograms</p>	 <p>Dangerous/harmful to animals</p>		 <p>Dangerous/harmful to fish – do not contaminate lakes, rivers, ponds or streams</p>

4.7 Colour bands

In previous versions of this guidance, FAO introduced a colour band scheme to indicate (mainly) acute health hazards of pesticide products, based either on the WHO *Classification of pesticides by hazard* [40] or on the GHS classification. For this edition, a revised colour band scheme was devised based only on the GHS classification (Annex 3).

In this scheme, bands of specific colours, linked to the hazard classification of the product, are printed horizontally at the bottom part of the label. Many countries, especially LMIC, require these hazard colour bands on their pesticide labels.

It is recommended that a colour band be used to denote both acute and severe chronic (i.e. carcinogenicity, mutagenicity and reproductive (CMR) toxicity) human health hazard classifications, to facilitate understanding by the pesticide user. The same colour is usually not permitted elsewhere on the label, except “red” which is also used for the hazard symbols under the GHS classification, regardless of the colour band.

All pesticide labels in a country could use the colour band scheme associated with the GHS classification, as recommended in the guidance. It is strongly recommended that the colour band scheme be the same within a region to prevent countries selling pesticides with different hazard colour bands.

The colour bands should reflect both acute toxicity and the severe chronic toxicity, such as the GHS hazard CMR Categories 1 and 2, if such chronic data is available. Specifically, it is recommended that a red colour code be used for the GHS hazard CMR Categories 1 and 2 products. The process for assigning a colour code is the following:

- **Step 1.** Determine the colour code (red, yellow, blue or grey) according to the acute toxicity, and then
- **Step 2.** Review the CMR hazards; if the product is classified in hazard Category 1 or 2 for CMR toxicity, the colour band should be adjusted to “red”, irrespective of the colour initially assigned in step 1 above.

4.8 Tactile warnings

Household pesticides and other pesticide products supplied to the general public may be handled by blind or visually impaired people. Therefore, a tactile warning should be printed on the label or product container.

The word *PESTICIDE* should be printed in braille on all labels of products supplied to the general public.

In addition, a tactile warning of danger, is required for pesticide products supplied to the general public which are classified by the responsible national authority as dangerous. A tactile warning of danger should at least be placed on all pesticide products in WHO hazard classes 1a and 1b, and the GHS acute toxicity categories 1 and 2; however, the responsible authority may also require such a warning for other hazard classes.

The tactile warning of danger generally takes the form of a raised triangle or three raised dots placed in a triangle, according to the relevant ISO standard (Figure 4.7) [41].



Figure 4.7 Tactile warning or danger in the form of a raised triangle.

4.9 First-aid and medical advice

This section of the label provides information to the pesticide user on appropriate first-aid for the various routes of exposure associated with accidental exposure. In principle, the label should provide information on:

- symptoms of poisoning;
- first aid treatment advice;
- guidance to the doctors and medical staff, with advice that poisonings be reported to the appropriate authorities for data collection and highlighting on the label if the co-formulants are more hazardous than the a.i. in the product; and
- where to obtain further advice.

The label should always contain the following statement:

If medical advice is needed, have product container or label at hand.

Any advice on treatment of poisoning should be described in sufficient detail that medical personnel can initiate emergency treatment as soon as the patient arrives (e.g. the antidote and how to administer it). Indications as to where further information on treatment of poisoning can be obtained should also be provided.

4.10 Accidental spills advice

A section of the label may provide advice to the user on how to clean up accidental spills. The exact measures to be taken will depend on the type of active ingredient and formulation. Label statements may include, as appropriate:

- *Keep people away from the spill area*
- *Wear personal protective equipment when cleaning up a spill*
- *Do NOT wash away into sewer. Do NOT let this chemical enter the environment*
- *Absorb liquid pesticides by covering the spill with absorbent materials, such as sawdust, clay or kitty litter*
- *Sweep spilled substance gently into containers; if appropriate, moisten first to prevent dusting*
- *Pour the contents of leaking container into an empty container that originally held same product or put the leaking container into a larger, clearly labelled container*
- *Contact {emergency phone number} in case of larger spills*

More specialized measures for managing and cleaning up accidental spills, directed to emergency

services, are generally provided in SDS but not on the pesticide label. Such information may also be provided through the QR code, if one is placed on the label.

4.11 Directions for use

The directions for use on the label must clearly indicate how, when and where the product can be legally used with maximum efficiency and safety. Elements that may be included are outlined in section 3.3.

In agriculture, directions for use should be in accordance with Good Agricultural Practice (GAP), as applicable. In other fields of use, the directions should follow best practices defined nationally or internationally [e.g. 42]. This information may be repeated and/or expanded in a separate leaflet or technical literature, but the essential instructions must always be displayed on the label. The label must emphasize that the attached (enclosed) leaflet, if one has been included, must be read before use.

The instructions must be clear for the end user. Any applicator, and especially the general consumer, who is a non-technical and occasional applicator, should easily understand and be expected to follow the directions for use. Therefore, all non-essential information, such as sales messages, should be omitted.

In many cases, graphics (charts, graphs, symbols, or pictures) can be used to help convey information in the section on “directions for use” of the label. The graphics must not, however, contain or imply false or misleading information and they must provide clear, concise, complete and accurate information. Subheadings help to organize information and also make it easier to find. Information presented in a “bulleted” format is easier to read and understand than longer narrative paragraphs, even when the same type size is used. When longer, more complicated information is required, a table may be easier to follow, in particular when the product can be used in various crops and against different pests.

Examples of standard phrases and statements relevant to the directions for use and good (agricultural) practices are given in Annex 2.

4.12 Use of positive statements on labels

Occasionally, positive statements on labels can be helpful. In particular, reference to use in specified IPM or IVM programmes may be included on the label if validated by the regulating authority, and the claim is qualified accordingly. This should be also in line with Article 11.2.8 of the Code of Conduct.

4.13 Avoiding misleading statements or claims

Certain statements or claims that are misleading, cannot be substantiated or could easily be wrongly understood, must not be used on the labels:

- Do not make false or misleading statements about the composition of the product.
- Do not make claims about safety, including statements such as “safe”, “non-poisonous”, “harmless”, “non-toxic”. “environmentally friendly” or “compatible with IPM”, “compatible with IVM”, with or without a qualifying phrase such as “when used as directed”.
- *[However, reference to use in specified IPM/IVM programmes may be included if validated by the regulating authority, and the claim is qualified accordingly].*

- Do not use statements comparing the risk, hazard or “safety” of the product with that of other pesticides or substances.
- Do not use superlatives, such as “best”, “most effective”, “superior control”, etc.
- Do not make statements that imply or suggest that the product can or will prevent or control human disease or protect health.
- Do not make claims that are inconsistent with the efficacy of the product established by testing.
- Do not make statements that directly or indirectly imply that the pesticide is recommended or endorsed by the government or a government agency, unless explicitly allowed by the competent authority.

4.14 Special-purpose labels

Variations to the general principles of labelling may be necessary for special purposes. A few instances are discussed below.

4.14.1 Bulk material

As indicated in the scope of this guidance, pesticide materials that are transported in bulk for reformulating, repacking or disposal should be appropriately labelled. In principle, labelling of bulk pesticides should follow the GHS [10], and a SDS should accompany such shipments.

4.14.2 Chemically treated seeds

Labelling of chemically treated seed requires a different approach, as the standard seed bag or sack is not a pesticide container and only carries information on the nature, weight and perhaps the origin of the contents.

Warning phrases should be applied to the outside of the bag, which cannot be removed and are in the language of the area where the seed is to be used. At a minimum, the following information should appear on the label [43].

- Statement: *Seed treated with* common name(s) of the active ingredient(s)
- Name of local distributor or supplier
- Warning: *Do not use treated seed for human or animal consumption or for processing*
- Warning: *Keep out of reach of children, livestock and wildlife*
- Contact details of the national/regional poison centre or other similarly qualified institution.
- User and operator safety information
- Environmental protection measures

In addition, the following information may appear:

- The rate (concentration) at which the active ingredient has been applied
- Commercial name of the pesticide product(s)

- Address, telephone number and email address of the local distributor or supplier

Standard precautionary phrases that should appear on the label are provided in Annex 2.

4.14.3 *Water-soluble bags*

An increasingly popular means of packaging dry pesticides is water-soluble bags. An important consideration in dealing with soluble packets is how to reduce the likelihood that the user will remove unlabelled packets from labelled containers long before using the product and then forget what they are.

As the immediate container is a water-soluble bag, label information should be printed on the bag itself. Although this is now technically feasible, many standard printing techniques and inks are not yet compatible with water-soluble films. Also, the bags tend to be relatively small, so that large amounts of information cannot be printed on them.

When printing on a water-soluble bag is feasible, the following minimum information should be printed on the bag itself:

- Product name
- Product registration number
- Formulation type
- Active ingredient (name and content)
- Hazard symbol and signal word
- Phrases such as:

DO NOT TOUCH {with wet hands or gloves}

Use immediately

Before using the product, read the full label

In all cases, the outer packaging should carry all the information required for safe and efficacious use of the product (see chapter 3). The most widely used packaging is tear-open foil envelopes, each containing a water-soluble bag; label on the foil envelope should bear the required information. Another packaging method is “muffin-pan” type package, in which each water-soluble bag is enclosed in a depression, with a top that seals each chamber and can be torn off. The tear-off top should bear the required label information.

The following phrases should also be on the outer package, to alert the operator to the hazards of touching the water-soluble bag:

DO NOT TOUCH WATER SOLUBLE BAG {with wet hands or gloves}

Place the whole bag directly into the spray tank

4.14.4 *Insecticides for treatment of mosquito nets*

Insecticides intended for treatment of mosquito nets have slightly different labels from agricultural or household pesticides. The label of the insecticide container should have the following information [44]:

- Product name
- Product category (e.g. insecticide, rodenticide)

- Type of formulation
- Active ingredient name
- Active ingredient content (g/kg or g/L)
- Name, identity and concentration of hazardous co-formulants, if any (i.e. all substances in the formulation that contribute to its hazard classification)
- Net contents of unit pack (e.g. L, g, kg)
- Batch number
- Registration number (if any)
- Hazard symbol, signal word and statements (if any) and colour band of formulated product
- Precautionary statements (always appear on the label):
 - KEEP LOCKED AWAY AND OUT OF REACH OF CHILDREN*
 - WEAR GLOVES*
 - WASH AFTER USE*
 - DO NOT eat, drink or smoke when using this product*
- Other precautionary statements and pictograms, as appropriate
- A tactile warning of danger for blind and visually impaired people
- First-aid and medical advice
- Accidental spills advice
- Intended dose of active ingredient per m² of netting when applied to a defined net
- Directions for use
- An instruction that the treatment must be repeated as recommended by the manufacturer
- Storage and disposal information of the product and packaging
- Local distributor or supplier name (registration holder)
- Manufacturer name and company logo (if different from the registration holder)
- Date of release of the product, or shelf-life for products with a shelf-life of less than 2 years after the date of release
- Reference to the WHO specification for the formulation (if applicable)
- Manufacturer's statement of compliance with the WHO specification for the product (if applicable)

4.14.5 *Insecticide-treated mosquito nets*

Most insecticide-treated mosquito nets currently sold or distributed are so-called “long-lasting insecticidal mosquito nets” (LLINs), in which an insecticide has been coated on or incorporated into the netting material.

The following, limited, information should be printed (in indelible ink) on a label attached to the net [44]:

- Brand or trade name

- Name of registration holder (if applicable) or manufacturer
- Registration number (if relevant)
- Name of active ingredient
- Concentration of active ingredient
- Size of the net
- Fibre composition
- Batch number
- Date of release
- Standard pictograms for washing: five pictograms according to ISO 3758, indicating: gentle wash at no more than 30 °C, no bleaching, no use of a drying machine, no ironing and no dry cleaning, should be washed separately from other clothes or household items.



The following information should be printed on the bag or a leaflet inside the transparent bag

- Brand or trade name
- Name of registration holder (if applicable) or manufacturer
- Registration number (if relevant)
- Name of active ingredient
- Concentration of active ingredient
- Size of net
- Fibre composition
- Batch number
- Date of release
- Standard pictograms for washing: five pictograms according to ISO 3758, indicating: gentle wash at no more than 30 °C, no bleaching, no use of a drying machine, no ironing and no dry cleaning



- Filament count
- Fabric weight (g/m²)
- Linear density of fibres
- Flammability
- Use instructions
- Care and washing instructions
- Any other information required by national regulations (e.g. disposal advice, uses other than those

authorized are not permitted)

The following information should be printed on the bale

- Brand or trade name
- Name of registration holder (if applicable) or manufacturer
- Registration number (if relevant)
- Name of active ingredient

4.15 How to check a label

Before a draft label is submitted to the regulatory authority, the content, structure, wording, style and quality should be checked and confirmed before and after printing.

Content

- Have all required label elements been included?
- Is all label text presented according to national criteria and regulations?
- Is there enough information on the label to protect the end-user and the environment?
- Are the label contents consistent with the labels of similar registered pesticide products?

Structure of information

- Does the layout meet the standards presented in this guidance?
- Are all the statements necessary?
- Are the headings clear?
- Is the information presented in logical sequence?

Wording of text

- Will all likely users understand the wording and message?
- Are abbreviations necessary and correct?
- Are sentences short and concise?
- Are all the instructions clear and unambiguous?
- Is there any unnecessary text on the label?

Print style

- Is the text predominantly black on a white background?
- Do the print size and style conform to the standards?
- Can you read all the text at arm's length in normal daylight?
- If all the text is not clearly visible (all safety text must be), has the user been instructed how to find the rest of the text – in the correct language?

The **printed label** should finally be checked to ensure:

- The colour contrast is satisfactory.

- All the print is clearly legible at arm's length.
- The safety text is on a part of the label that is to be firmly fixed to the pack.
- The illustrations are relevant to the message and understandable to the user.
- Instructions for finding supplementary information are clear.
- The printed label is accurate, i.e., is the same as the approved draft.
- Fold-out labels can be easily read.
- Perforations and other aids are effective.

Quality of material

When paper is used for labels and packaging leaflets, it must be:

- Strong enough to avoid tearing during transport and handling.
- Durable to withstand storage.
- Coated to resist wetting and smudging of text.
- Able to accept print without smearing.

The ink and adhesive must also be durable and not affected by extremes of climate or contact with the product.

5. Hazard classification

5.1 Introduction

An important function of the label is to warn the user of the hazard of the pesticide. According to the GHS, the main elements for hazard communication on a label are the:

- Hazard symbol (see section 4.6)
- Signal word (see section 4.4)
- Hazard statement (see section 4.4)

In order to assign hazards to a product effectively, the pesticide must be classified according to its hazards. In principle, a pesticide product or pesticide formulation, as offered for distribution, sale or use, should be classified, to take into account the properties of the solvents, adjuvants or other co-formulants in addition to the active ingredient. In some cases, however, classification will be based only on data available on the active ingredient (e.g. for certain chronic hazards).

Three types of hazard are generally shown on a pesticide label:

- Physical hazards (e.g. flammability, corrosiveness)
- Health hazards (e.g. acute toxicity, chronic toxicity, eye and skin irritation)
- Environmental hazards (e.g. for aquatic organisms)

The hazard classifications discussed below are those of the GHS but apply specifically to pesticide labels. The WHO *Recommended classification of pesticides by hazard*, applicable only to health hazards, is also presented.

In many countries, chemical hazard classification is legally defined, quite often by other regulatory instruments than pesticide legislation. Pesticide labelling should follow applicable national legislation in that respect.

5.2 Hazard classification and risk assessment

Both hazard classification and risk assessment are generally conducted during registration of a pesticide product. It is important to understand the difference between the two and its relation to the pesticide label.

Hazard classification aims to define the hazard of a pesticide product as it is made available to the user, for instance in a bottle, plastic container, bag or box. Hazard classification is based on the intrinsic properties of the pesticide product, and therefore does not take into account the extent of exposure to the pesticide during its use. The hazard classification of a pesticide product may result in assignment of a hazard symbol, signal word and hazard statement for use on the label.

Risk assessment, on the other hand, aims to evaluate the likelihood of an adverse health or environmental effect and the severity of that effect, after exposure to a pesticide product during actual conditions of use. The risk of a pesticide therefore depends on the local situation and takes into account, for instance, the crop onto which the product is applied, the application rate, frequency and equipment, levels of exposure and the population most heavily exposed, local environmental conditions and any PPE used.

Risk assessment results in a decision on whether to authorize the use of a pesticide product, and the identification of any risk mitigation measures required to reduce the risks to an acceptable minimum. Risk assessment may therefore lead to definition of precautionary statements and the assignment of precautionary pictograms on the label.

As hazard classification and risk assessment follow different procedures and serve different purposes, a pesticide product may require certain hazard classifications on its label but is still authorized for use because the responsible authority considered that the risk of using it is acceptable (with or without risk mitigation measures). Similarly, although a pesticide may not be classified for certain hazards, its use may not be without any risk and precautions may still be required to limit exposure and minimize risk.

5.3 Physical hazards

It is recommended that the physical hazards of a pesticide product be classified according to the GHS, with defined classification criteria and label elements (hazard symbol, signal word and hazard statement). However, not all physical hazards described in the GHS are relevant to pesticides, as a substance would not be authorized as a pesticide if it posed such hazards (e.g. explosive or self-reactive substances). Table 5.1 provides guidance on the physical hazards that are likely to be relevant for pesticides.

Reference should be made to the GHS “purple book” for the criteria for classification and for the label elements recommended for each hazard category [10].

If a pesticide product poses more than one GHS physical hazard, all relevant symbols, signal words and hazard statements should be on the label.

5.4 Health hazards

Two international systems are currently used to classify health hazards of pesticides, the GHS [10] and the WHO *Recommended classification of pesticides by hazard* [40]. The GHS has become the international standard for classification and labelling of chemicals, including pesticides; however, many countries still apply the WHO classification for pesticide labelling purposes. **This guidance recommends use only of the GHS for pesticide labelling.**

5.4.1 GHS hazard classification

The GHS can be used to classify a pesticide according to a wide range of potential health hazards, ranging from acute toxicity to various chronic effects (Table 5.2).

For labelling purposes, the pesticide formulation or end-user product (and not the active ingredient) should, in principle, be classified, although for chronic health hazards generally only data on the active ingredient are available and can therefore be used. Reference should be made to the GHS for the criteria for classifying health hazards [10].

Table 5.1 Physical hazards as defined in the GHS and their likely relevance for pesticide labelling.

GHS chapter	Hazard	Likely to be indicated on a pesticide label?	Remarks
2.1	Explosives	No	Such substances are normally not used as pesticides
2.2	Flammable gases	Yes	e.g. ethylene gas
2.3	Flammable aerosols	Yes	e.g. certain aerosol sprays
2.4	Oxidizing gases	No	Such substances are normally not used as pesticides
2.5	Gases under pressure	Yes	e.g. methyl bromide, carbon dioxide, aerosol sprays
2.6	Flammable liquids	Yes	
2.7	Flammable solids	Yes	Not common, but there are a few examples where this applies to pesticides
2.8	Self-reactive substances and mixtures	No	Such substances are normally not used as pesticides
2.9	Pyrophoric liquids	No	Such substances are normally not used as pesticides
2.10	Pyrophoric solids	No	Such substances are normally not used as pesticides
2.11	Self-heating substances and mixtures	Yes	Not common, but there are a few examples where this applies to pesticides
2.12	Substances and mixtures which, in contact with water, emit flammable gases	Yes	e.g. aluminium phosphide, magnesium phosphide Certain of these substances may also emit flammable gases after contact with moist air
2.13	Oxidizing liquids	Yes	e.g. sodium chlorate, sodium hypochlorite
2.14	Oxidizing solids	Yes	[Note: such products previously tended to be labelled as "corrosive"]
2.15	Organic peroxides	Yes	e.g. hydrogen peroxide, peracetic acid [Note: such products previously tended to be labelled as "corrosive"]
2.16	Corrosive to metals	Yes	

If a pesticide product poses more than one GHS health hazard, the following precedence of relevant symbols and signal words to be shown on the label applies:

- If the skull-and-crossbones symbol applies for one of the hazards, no exclamation mark should appear for another hazard.
- If the corrosion symbol applies, the exclamation mark should not appear where it is used for skin or eye irritation.
- If the health hazard symbol appears for respiratory sensitization, the exclamation mark should not appear where it is used for skin sensitization or for skin or eye irritation.

All assigned hazard statements should, however, appear on the label. The only exception is:

- If the statement H314 "causes severe skin burns and eye damage" is assigned, the statement H318 "causes serious eye damage" may be omitted.

Furthermore, if hazard colour bands are shown on the label, and the pesticide product poses more than one GHS health hazard, only the most hazardous colour band is shown on the label.

Table 5.2 Health hazards as defined in the GHS and their likely relevance for pesticide labelling.

GHS chapter	Hazard	Likely to be indicated on a pesticide label?	Remarks
3.1	Acute toxicity <ul style="list-style-type: none"> • oral • dermal • inhalation 	Yes	
3.2	Skin corrosion/irritation	Yes	
3.3	Serious eye damage/eye irritation	Yes	
3.4	Respiratory or skin sensitization	Yes	
3.5	Germ cell mutagenicity	No/Yes ^a	If pesticides that show germ cell mutagenicity are authorized, appropriate hazard labelling should be carried out.
3.6	Carcinogenicity	No/Yes ^a	If pesticides that are carcinogenic are authorized, appropriate hazard labelling should be carried out.
3.7	Reproductive toxicity	No/Yes ^a	If pesticides that are a reproductive toxicant are authorized, appropriate hazard labelling should be carried out.
3.8	Specific target organ systemic toxicity – single exposure	Yes	
3.9	Specific target organ systemic toxicity – repeated exposure	No	If pesticides that result in specific target organ systemic toxicity after chronic exposure are authorized, appropriate hazard labelling should be carried out.
3.10	Aspiration hazard	Yes	

^a This revised guidance recommends that the colour bands (see section 4.7) denote both acute and severe chronic toxicity.

Further to the hazard communication elements discussed above, an assessment of the risk of use of the pesticide product for human health may result in addition of specific precautionary statements and pictograms on the label.

5.4.2 WHO hazard classification

In previous versions of this guidance, *The WHO recommended classification of pesticides by hazard* [40] was primarily used to classify and label a pesticide according to acute toxicity. The WHO classification also covers the chronic hazards of some pesticides (e.g. carcinogenicity, reproductive toxicity), when internationally acceptable evaluations are available; however, it does not review systematically the chronic hazards of all pesticides.

The classification criteria and classes in the WHO classification are different from those in the GHS.

In addition to providing classification criteria (similar to the GHS), the WHO classification also lists peer-reviewed data on acute toxicity (oral and dermal LD₅₀ values) for the active ingredients, which can be compared with data from pesticide registration dossiers or other sources used at national level.

To avoid possible conflicts in classification and confusion for users, **only the GHS classification**, and not the WHO classification, **should be applied to classify and assign label elements for all health hazards in a given country.**

5.4.3 Transition from WHO to GHS

The GHS is increasingly being adopted by countries and by international organizations for the classification and labelling of chemicals [45]. Harmonized classification and labelling, across both borders and chemical groups, is important to increase comprehension of chemical risks and facilitate trade in chemical products. FAO and WHO therefore strongly recommend progressive adoption of the GHS for classification and labelling of pesticides. As many countries still apply the WHO *Recommended classification of pesticides by hazard*, both systems are discussed above. During transition to the GHS, it is recommended that the two classifications not be mixed; for instance, the WHO classification for acute toxicity should not be combined with the GHS classification for other health hazards.

Countries that wish to make the transition from the WHO classification to the GHS for pesticide labelling should do so at a fixed date and for all pesticide labels at the same time. Sufficient advance warning should be given to pesticide manufacturers and importers so they can design new labels and prepare the logistics of the transition. Government and private extension and advisory services should also adapt their training and information materials on pesticides. This preparatory time should also be used by regulators to inform pesticide users about any changes in hazard symbols, signal words and hazard statements.

WHO amended its classification in 2009, to align it more closely with the GHS (although the two systems are not identical) and subsequently revised it in 2019 to use latest available WHO evaluations. Countries that still apply the WHO 2004 classification and wish to implement the GHS for pesticide labelling should do so directly and not apply the WHO 2009/2019 classification as an intermediate solution, as this would result in two subsequent changes of classification and labelling, leading to increased costs for the pesticide industry and probably greater confusion among pesticide users.

Countries that have adopted the GHS for classification and labelling of household and industrial chemicals but maintain the WHO classification for health hazards of pesticides may face an additional complication. As SDS for chemicals are generally recommended to follow the GHS, contradictions in hazard communication between the label and the SDS can occur: different signal words, hazard statements and hazard symbols may be applied on the label and the SDS of the same pesticide product. This situation is obviously not recommended and should be addressed during preparation of the transition.

5.5 Environmental hazards

At present, only hazards to the aquatic environment and to the ozone layer are classified by the GHS. No other environmental hazards are covered (Table 5.3)

Table 5.3 Environmental hazards as defined in the GHS and their likely relevance for pesticide labelling.

GHS chapter	Hazard	Likely to be indicated on a pesticide label?	Remarks
4.1	Hazardous to the aquatic environment	Yes	
4.2	Hazardous to the ozone layer	No	With the exception of methyl bromide
--	Other environmental hazards (e.g.: for wildlife, livestock, pollinators, natural enemies of pests, soil organisms, groundwater, etc.)	--	Not covered by the GHS

For labelling purposes, the pesticide formulation or end-user product, and not the active ingredient, should in principle be classified. Reference should be made to the GHS for the criteria for classifying environmental hazards [10].

If a pesticide product poses more than one GHS environmental hazard, the following precedence of hazard statements to be shown on the label applies:

- If the statement H410 “very toxic to aquatic life with long lasting effects” is assigned, the statement H400 “very toxic to aquatic life” may be omitted.
- If the statement H411 “toxic to aquatic life with long lasting effects” is assigned, the statement H401 “toxic to aquatic life” may be omitted.
- If the statement H412 “harmful to aquatic life with long lasting effects” is assigned, the statement H402 “harmful to aquatic life” may be omitted.

In addition to the hazard communication elements discussed above, environmental risk assessment of the use of the pesticide product may require inclusion of specific precautionary statements and pictograms on the label. This will apply to the hazards covered by the GHS but also to a wider range of environmental risks, such as possible adverse effects on birds, wildlife, livestock, bees, natural enemies of pests, soil organisms and processes, groundwater.

6. Information, training and compliance

The pesticide label is an essential tool to provide information on judicious and effective use of a pesticide. Pesticide labels and/or pictograms are, however, often insufficient in themselves to ensure that pesticides are used as intended and that all necessary safety precautions are taken or the proper emergency response is chosen [15 – 22]. Problems with comprehension tend to be even greater if the users are illiterate or cannot read the language on the label, or when pictograms need to be understood across cultures.

Therefore, pesticide use and risk communication should not be limited to pesticide labels. Other risk communication strategies should be used for populations with limited literacy and little formal education. Examples are: popular media, posters in locations where pesticides are purchased, billboards, the sides of public transport vehicles, walls and buildings as appropriate, laminated cards in local language(s) explaining the label information (Annex 5). Training and education are essential factors to increase users' comprehension of labels [e.g. 46, 47]. Without regular provision of information, training and education of pesticide users, even the best- designed labels are likely to be ineffective [48].

Both governments and the pesticide industry should consider setting up systems to ensure that pesticide users are regularly informed and trained in proper pesticide use and pesticide risks, including how to read and use pesticide labels. This is of particular importance when certain important new label elements, such as pictograms, are introduced. A more sustained approach would be to introduce instruction in the reading of pesticide labels in school curricula, in modules on chemistry, chemical safety or biological sciences.

Finally, authorities should ensure that inspection and enforcement activities include evaluation of the compliance of the labels with national regulations and find ways to identify non-compliant, illegal and counterfeit pesticides by careful examination of labels. Inspectors should also report non-compliant labels and labels that are difficult to understand to the appropriate authorities in order to improve their effectiveness.

References

- [1] **FAO and WHO.** 2014. *The International Code of Conduct on Pesticide Management*. Rome, FAO. [available at <http://www.fao.org/3/I3604E/i3604e.pdf>].
- [2] **FAO/WHO.** 2017. *Guidelines for the registration of microbial, botanical and semiochemical pest control agents for plant protection and public health uses*. Rome, FAO [available at <http://www.fao.org/3/a-i8091e.pdf>].
- [3] **FAO.** 2012. *Guidelines on Prevention and Management of Pesticide Resistance*. Rome, FAO [available at <http://www.fao.org/3/bt561e/bt561e.pdf>].
- [4] **FAO and WHO.** 2010. *Guidelines for the Registration of Pesticides*. Rome, FAO. [available at <http://www.fao.org/3/a-bt567e.pdf>].
- [5] **FAO/WHO.** 2020. *Guidance on pesticide legislation. Second edition*. Rome, FAO [available at <http://www.fao.org/3/cb0916en/cb0916en.pdf>].
- [6] **FAO.** 1985. *Guidelines on good labelling practice for pesticides*. Rome, FAO [replaced by this guidance].
- [7] **FAO.** 1988. *Pictograms for pesticide labels – an aid to the safe handling of pesticides*. Rome, FAO [replaced by this guidance].
- [8] **GIFAP.** 1988. *Pictograms for agrochemical labels – an aid to the safe handling of pesticides*. Brussels, Groupement International des Associations Nationales des Fabricants de Produits Agrochimiques.
- [9] **FAO.** 1995. *Guidelines on good labelling practice for pesticides*. Rome, FAO [replaced by this guidance].
- [10] **UNECE.** 2019. *The Globally harmonized system of classification and labelling of chemicals (GHS) Eight revised edition*. Geneva, United Nations Economic Commission for Europe [Available at: http://www.unece.org/trans/danger/publi/ghs/ghs_welcome_e.html].
- [11] **WHO.** 2003. *Draft guidelines on the management of public health pesticides*. Report of the WHO Interregional Consultation, Chiang Mai, Thailand, 25-28 February 2003. Geneva, WHO.
- [12] **OECD.** 2006. *Report of the OECD Pesticide risk reduction steering group seminar on risk reduction through good pesticide labelling*. Paris, 1 March 2005. OECD Series on Pesticides No. 29. Paris, Organisation for Economic Co-operation and Development [available at: [http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=env/jm/mono\(2006\)13&doclanguage=en](http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=env/jm/mono(2006)13&doclanguage=en)].
- [13] **Wilkinson RL, Cary JW, Barr NF & Reynolds J.** 1997. *Comprehension of pesticide safety information: effects of pictorial and textual warnings*. *International Journal of Pest Management* 43(3): 239-245.
- [14] **Davies S, Haines H, Norris B & Wilson JR.** 1998. *Safety pictograms: are they getting the message across?* *Applied Ergonomics* 29(1): 15-23.
- [15] **EC.** 1999. *Study on comprehensibility of labels based on Directive 88/379/EEC on dangerous preparations*. European Commission, DG III, Brussels.
- [16] **Edworthy J, Hellier E, Lambell N, Grey C, Aldrich K & Lee A.** 2001. *The effectiveness of*

labelling of pesticides. Health and Safety Executive, Norwich [available at: http://www.hse.gov.uk/research/crr_pdf/2001/crr01390.pdf].

- [17] **Rubbiani M.** 2010. Survey among agricultural workers about interpretation of plant protection product labels and safety data sheets. *Annali dell'Istituto Superiore di Sanita* 46(3) : 323-329.
- [18] **Tourneux H.** 1994. *L'interprétation paysanne des pictogrammes phytosanitaires*. Agriculture et Développement 1 : 39-42.
- [19] **Banda SF & Sichilongo K.** 2006. *Analysis of the level of comprehension of chemical hazard labels: a case for Zambia*. *Science of the Total Environment* 363:22-27.
- [20] **Ayaji OC & Akinnifesi K.** 2007. *Farmers' understanding of pesticide safety labels and field spraying practices: a case study of cotton farmers in northern Côte d'Ivoire*. *Scientific Journal and Essay* 2(6): 204-210.
- [21] **Waichman AV, Eve E, da Silva Nina NC.** 2007. *Do farmers understand the information displayed on pesticide product labels? A key question to reduce pesticide exposure and risk of poisoning in the Brazilian Amazon*. *Crop Protection* 26: 576-583.
- [22] **Rother H-A.** 2008. South African farm workers' interpretation of risk assessment data expressed as pictograms on pesticide labels. *Environmental Research* 108: 419-427.
- [23] **EC.** 1991. *Council Directive 91/414/EEC of 15 July 1991 concerning the placing of plant protection products on the market (and subsequent amendments)*. Brussels, European Community [available at: <http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1413956729860&uri=CELEX:31991L0414>].
- [24] **EC.** 1999. *Directive 1999/45/EC of the European Parliament and of the Council of 31 May 1999 concerning the approximation of the laws, regulations and administrative provisions of the Member States relating to the classification, packaging and labelling of dangerous preparations*. Brussels, European Community [available at: <http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1413956791421&uri=CELEX:31999L0045>].
- [25] **EC.** 2008. *Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures*. Brussels, European Community [available at: <http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1413956855748&uri=CELEX:32008R1272>].
- [26] **EC.** 2009. *Regulation (EC) No 1107/2009 of the European Parliament and of the Council of 21 October 2009 concerning the placing of plant protection products on the market and repealing Council Directives 79/117/EEC and 91/414/EEC*. Brussels, European Community [available at: <http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1413956906073&uri=CELEX:32009R1107>].
- [27] **Government of the United States of America.** 2010. *Labelling requirements for pesticides and devices*. Code of Federal Regulations. Title 40 – Protection of environment, Part 156. Government Printing Office, Washington D.C. [available at: <http://www.ecfr.gov/cgi-bin/text-idx?SID=ca635b82c0327946ef743ad22e827466&mc=true&node=pt40.24.156&rgn=div5http://ecfr.gpoaccess.gov/>]
- [28] **USEPA.** 2011. *Label review manual*. Office of Pesticide Programs, United States Environmental Protection Agency, Washington D.C. [available at: <http://www.epa.gov/oppfead1/labeling/lrm/>].
- [29] **Government of Canada.** 2006. *Pest control products regulations*. P.C. 2006-484 June 6, 2006. *Canada Gazette* 140 (13) – June 28, 2006 [available at:

- <http://publications.gc.ca/gazette/archives/p2/2006/2006-06-28/pdf/g2-14013.pdf>].
- [30] **PSD**. 2014. *The labelling handbook*. Health and Safety Executive, York [available at: <http://www.pesticides.gov.uk/approvals.asp?id=872>].
- [31] **CropLife International**. 2012. *The implementation of the Globally Harmonised System of Classification and Labelling of Chemicals and labelling of crop protection products*. Position paper. Brussels, CropLife International [available at: <http://croplife.org/crop-protection/regulatory/product-management/globally-harmonized-system-of-hazard-classification-and-labeling/>].
- [32] **FAO/WHO**. 2015. *Guidelines on good labelling practice for pesticides*. Food and Agriculture Organization of the United Nations, Rome [replaced by this guidance].
- [33] **UNECE**. 2013. *UN Recommendations on the transport of dangerous goods – Model regulations*. 18th revised edition. Geneva, United Nations Economic Commission for Europe [available at: http://www.unece.org/trans/danger/publi/unrec/rev13/13nature_e.html].
- [34] **CropLife**. 2008. *Catalogue of pesticide formulation types and international coding system*. 6th edition, revised May 2008. Technical Monograph n°2. Brussels, Crop Life International [available at: <http://croplife.org/wp-content/uploads/2014/05/Technical-Monograph-2-Revised-May-2008.pdf>].
- [35] **ISO**. 1981. *Common names for pesticides and other agrochemicals*. ISO Standard 1750 (including amendments). Geneva, International Organization for Standardization.
- [36] **IUPAC**. Various dates. *Nomenclature of Organic Chemistry* (the “Blue Book”), and *Nomenclature of Inorganic Chemistry* (the “Red Book”). International Union of Pure and Applied Chemistry, Research Triangle Park, North Carolina, US. [Links at: <http://old.iupac.org/publications/books/seriestitles/nomenclature.html>].
- [37] **FAO/WHO**. 2020. *Guidelines for personal protection when handling and applying pesticides*. Rome, FAO. [available at <http://www.fao.org/documents/card/en/c/ca7430en>].
- [38] **ISO**. 2015. *Information technology – Automatic identification and data capture techniques – QR Code bar code symbology specification. ISO/IEC Standard 18004. Third edition*. Geneva, International Organization for Standardization.
- [39] **FAO/WHO**. 2020. *Guidance on management of household pesticides*. Rome, FAO [available at: <https://www.fao.org/publications/card/en/c/CB1339EN/>].
- [40] **WHO**. 2019. *The WHO recommended classification of pesticides by hazard and Guidelines to Classification*. Geneva, WHO [available at: <https://apps.who.int/iris/bitstream/handle/10665/332193/9789240005662-eng.pdf?ua=1>].
- [41] **ISO**. 1997. *Packaging – Tactile warnings of danger – Requirements*. ISO Standard 11683. Second edition, corrected version 1998-09-01. International Organization for Standardization, Geneva.
- [42] **WHO**. 2006. *Pesticides and their application – For the control of vectors and pests of public health importance*. 6th edition. Geneva, WHO [available at: http://whqlibdoc.who.int/hq/2006/WHO_CDS_NTD_WHOPES_GCDPP_2006.1_eng.pdf]
- [43] **ISF**. 2014. *Guidelines on labelling treated seed*. May 2014. Nyon, International Seed Federation [available at: <http://www.worldseed.org/isf/publications.html>]
- [44] **WHO**. 2012. *Guidelines for procuring public health pesticides*. Document

WHO/HTM/NTD/WHOPES/2012.4. Geneva, WHO [available at: http://whqlibdoc.who.int/publications/2012/9789241503426_eng.pdf?ua=1].

- [45] **UNECE**. 2021. *GHS implementation*. Geneva, UNECE [available at: <https://unece.org/ghs-implementation-01>].
- [46] **Wogalter MS, Sojourner RJ & Brelsford JW**. 1997. *Comprehension and retention of safety pictorials*. *Ergonomics* 40: 531–542.
- [47] **Wang A-H, Chi C-C**. 2003. *Effects of hazardous material symbol labelling and training on comprehension according to three types of educational specialization*. *International Journal of Industrial Ergonomics* 31: 343-355.
- [48] **DTI**. 2002. *The impact of labelling schemes*. London, Department of Trade & Industry.

Annex 1 – Print size and style guide

The right hand edge of the sheet below is marked with print size graduations. Point size is the distance between the top of a capital letter and the bottom of a lower-case descender (e.g. between L and p). This text is in 11 point.

Minimum print sizes

All safety text should be at least 8 point, and all other text should be at least 6 point. The preferred size is 11 point.

For labels that may not be read in perfect condition, it is sensible to aim for a minimum of 8 point for all text.

Examples of print sizes

This is an example of 6 point print. Under most practical conditions in the field it is likely to be too difficult to read, and thus should be used only where there is absolutely no alternative.	6 point (1.25 mm)
	7 point (1.75 mm)
This is an example of 8 point print which, in most cases, should be the minimum on labels.	8 point (2 mm)
Bold print can be used at this size but not below	
This is an example of 10-point print, which is easy to read by most people under most conditions.	10 point (2.5 mm)
This is an example of 11-point, the size preferred by FAO	11 point (2.7mm)

Print Style

- Condensed print should never be used:
Condensed print is difficult to read at any print size
- Leading is the space between lines, measured in points.
On labels, the minimum should be 2 points for ease of reading
- How easy is it to read this sentence? (+10)
- How easy is it to read this sentence? (standard)
- Italic print should be used for **Latin names** only
- **Bold print should be used for emphasis.**
- Print on a label should all run in the same direction and should never overlap, even in a different colour.

Annex 2 – Examples of precautionary statements

A. Introduction

Proposals for safety precautions, first-aid instructions, advice to doctors and warning phrases are initially drawn up by companies or individuals who are submitting labels for approval, and are based on knowledge of the chemical, its formulation, uses, toxicity and potential hazards. Final acceptance of the proposals is, however, the responsibility of the registration authority. The statements used must convey potential hazards clearly and concisely, with a minimum of words.

This guidance provides examples of statements that can be used on product labels. The list is not exhaustive; many other statements may be appropriate, depending on the product, its intended use and hazard/risk classification. The exact wording used on the label will be determined to some extent by the conventions of the local language.

B. Signal words and hazard statements

Signal words and hazard statements are directly determined by the hazard classification of a pesticide product. They are internationally highly standardized (see section 4.4). The recommended hazard statements and signal words for different hazard categories, according to the GHS, can be found in the GHS “purple book” [10].

C. Precautionary statements

Precautionary statements are not internationally harmonized and tend to be defined nationally. The required precautionary statements are often defined by risk assessments conducted during pesticide registration to mitigate the identified risks.

The GHS provides suggestions for precautionary statements and associates them with specific hazard classes of pesticides. The GHS precautionary statements are not repeated here, but the reader is referred to Annex 3 of the GHS “purple book” [10] for further information.

Below are examples of additional precautionary statements, not listed in the GHS, that may be relevant to specific hazards or risks of pesticides.

General precautionary statements

The following general precautionary statements should, in principle, appear on the labels of **all pesticide products**:

- *READ THE LABEL BEFORE USE*
- *KEEP LOCKED AWAY AND OUT OF REACH OF CHILDREN*
- *DO NOT eat, drink or smoke when using this product*
- *WASH AFTER USE*
- *If medical advice is needed, have product container or label at hand*

Note that some of these precautionary statements are slightly different from those of the GHS, as they address pesticides specifically.

Physical hazards and risks

The appropriate precautionary statements for physical hazards and risks depend on the pesticide and its formulation and should be specified by the manufacturer and agreed by the competent authority. Annex 3 of the GHS “purple book” [10] suggests prevention and response statements that are also applicable to pesticides.

Health hazards and risks

The appropriate precautionary statements on health hazards and risks depend on the pesticide and its formulation and should be specified by the manufacturer and agreed by the competent authority. Annex 3 of the GHS “purple book” [10] suggests prevention and response statements that are also applicable to pesticides.

In addition, the following examples of precautionary statements not listed in the GHS may be relevant to pesticide products.

Worker protection

- *Do not enter or allow worker entry into treated areas during the restricted-entry interval of ... {include duration}*

Resident protection

- *DO NOT apply to clothing, bedding or fabrics.*
- *KEEP UNPROTECTED PERSONS OUT OF TREATED AREAS for at least ... {appropriate duration to be specified}*
- *DO NOT USE in occupied dwellings.*
- *VENTILATE TREATED AREAS thoroughly when gas/smoke has cleared*

Consumer protection

- *Keep away from food, drink and animal feeding stuffs*
- *DO NOT apply to food or feed crops.*
- *DO NOT apply to surfaces coming into contact with food.*
- *REMOVE OR COVER FOOD before treatment.*
- *DO NOT apply later than ... [number] days/weeks before harvest.*
- *DO NOT treat/apply to stock later than ... [number] days before slaughter.*

Environmental hazards and risks

The appropriate precautionary statements for environmental hazards and risks depend on the pesticide and its formulation and should be specified by the manufacturer and agreed by the competent authority. Annex 3 of the GHS “purple book” [10] suggests very few statements.

The following examples of precautionary statements for environmental hazards and risks may therefore be relevant to pesticide products.

Livestock

- *DANGEROUS/HARMFUL to domestic animals and wildlife.*
- *Before treatment REMOVE livestock.*
- *Dangerous/harmful to livestock. Keep livestock out of treated areas for at least ...[number] hours/days after last treatment.*

Aquatic organisms

- *DANGEROUS/HARMFUL to fish. Do not contaminate water with the product or its container. Do not clean application equipment near surface water. Avoid contamination via drains from farmyards and roads.*
- *To protect aquatic organisms/non-target plants/non-target arthropods/insects respect an unsprayed buffer zone of (distance to be specified) from non-agricultural land/surface water bodies.*

Groundwater

- *To protect groundwater do not apply this product more than ... {specify time period or frequency}.*
- *This chemical may leach into groundwater if used in areas where soils are permeable, particularly where the water table is shallow.*

Birds and mammals

- *DANGEROUS/HARMFUL to {birds} {mammals} or {birds and mammals}.*
- *DO NOT APPLY during the bird breeding period.*
- *To protect birds/wild mammals the product must be entirely incorporated in the soil.*
- *Treated {seed} {granules} {pellets} {baits} exposed on soil surface may be hazardous to {birds} {wildlife} {birds and other wildlife}. Cover or collect {seeds} {granules} {pellets} {baits} spilled during loading.*

Honey bees

- *DANGEROUS TO BEES. To protect bees and other pollinating insects {do not apply to crop plants when in flower} {do not use where bees are actively foraging} {remove or cover beehives during application and for ... {state time} after treatment} {do not apply when flowering weeds are present} {remove weeds before flowering} {do not apply before ... {state time}}.*

Storage

The appropriate precautionary statements for pesticide storage depend on the pesticide and its formulation and should be specified by the manufacturer and agreed by the competent authority. Annex 3 of the GHS “purple book” [10] suggests precautionary statements that are also applicable to pesticides.

In addition, the following examples of precautionary statements not listed in the GHS may be relevant to pesticide products.

- *Storage areas must be locked and secure from vandalism, with precautionary signs posted.*

- *Always store pesticides in the original container. If a leaky container must be contained within another, mark the outer container to identify the contents.*
- *The storage area must be dry, well-lit, and well-ventilated. Keep pesticide storage areas clean. Clean up any spills promptly.*
- *Store herbicides, insecticides and fungicides in separate areas within the storage unit.*

Disposal

The appropriate precautionary statements for pesticide disposal depend on the pesticide and its formulation and should be specified by the manufacturer and agreed by the competent authority. Annex 3 of the GHS “purple book” [10] suggests only a few precautionary statements that are also applicable to pesticides.

The following examples of precautionary statements not listed in the GHS may be relevant to pesticide products.

- *DO NOT re-use this container for any purpose.*
- *Return empty container to the supplier.*
- *Pesticide wastes may be hazardous. Improper disposal of excess pesticide, spray mixture or rinsate is a violation of National Law. If these wastes cannot be disposed of according to label instructions, contact ... {specify which government entity to be contacted}*
- *Wastes resulting from the use of this product must be disposed of at an approved waste disposal facility.*
- *Triple-rinse empty container and add rinsate to the spray tank.*
- *If empty: Place in trash or offer for recycling, if available [for household products]*

Agricultural practice

The appropriate agricultural practice statements depend on the exact use pattern (e.g. crop, disease vector), the pesticide and its formulation, and should be specified by the manufacturer and agreed by the competent authority. No agricultural practice statements are given in the GHS [10].

The following examples of precautionary statements for specific agricultural practices may be relevant to pesticide products.

Treated seed

In general

- *Do not use treated seed for human or animal consumption or for processing.*
- *Keep out of reach of children, livestock and wildlife.*
- *Handle seed packages carefully.*
- *Avoid contact with skin and respiratory tract and wear suitable protective equipment during seed handling and equipment cleaning.*
- *Wash hands and exposed skin before meals and after work.*
- *Remove any seed spillages.*
- *Keep treated seeds away from surface water.*

Before sowing

- *When opening seed bags and during, filling or emptying of the drilling machine, avoid exposure to dust.*
- *Avoid transfer of dust from the seed bag into a sowing machine.*
- *Do not treat previously treated seeds with additional products.*

At sowing outdoors

- *Use adequate seed drilling equipment to ensure a high degree of incorporation into soil, minimization of spillage and minimization of dust emission.*
- *Sow at the recommended seeding rate.*
- *To protect birds and mammals, treated seeds must be covered by soil, also at the ends of rows.*

After sowing

- *Do not leave empty bags or leftover treated seed in the environment. Dispose of them according to local legislation.*
- *Ensure that leftover treated seed is returned to their original bag and do not use empty seed bags for other purposes.*

Baits

- *Remove any spillage.*
- *Place the baits securely to minimise the risk of consumption by other animals. Secure bait blocks so that they cannot be dragged away by rodents.*
- *Mark the treatment area during treatment.*
- *Remove dead rodents from the treatment area each day during treatment. Do not place in refuse bins or on rubbish tips.*
- *Remove all baits after completion of treatment.*

Care of equipment





- *Keep application equipment in good condition, free from leaks and external contamination. Clean regularly.*

Annex 3 – Hazard colour bands

This annex provides the hazard classifications of the GHS [10] for i) acute and ii) severe chronic i.e. carcinogenicity, mutagenicity and/or reproductive (CMR) toxicity and the recommended associated hazard colour bands. The codes for the colour bands below are based on the PMS colour matching system, used mainly by printers, and devised and patented by Pantone Inc., USA. It is recommended that hazard colour bands be printed horizontally at the bottom of the label.



Please also refer to section 4.7 on colour bands.

i) GHS – Acute toxicity

	Hazard category					
	Category 1	Category 2	Category 3	Category 4	Category 5	Not classified i.e. toxicity lower than Cat 5
Pictogram/ Symbol					<i>No pictogram</i>	<i>No pictogram</i>
Signal Word	Danger	Danger	Danger	Warning	Warning	<i>No signal word</i>
Hazard Statement						
Oral	Fatal if swallowed	Fatal if swallowed	Toxic if swallowed	Harmful if swallowed	May be harmful if swallowed	
Dermal	Fatal in contact with skin	Fatal in contact with skin	Toxic in contact with skin	Harmful in contact with skin	May be harmful in contact with skin	
Inhalation	Fatal if inhaled	Fatal if inhaled	Toxic if inhaled	Harmful if inhaled	May be harmful if inhaled	
Colour band	PMS red 199 C	PMS red 199 C	PMS Yellow C	PMS Blue 293 C	PMS Blue 293 C	PMS Cool Grey 7C

Note: The GHS pictograms (above and below) should only be used if the classification is according to the GHS criteria.

ii) GHS – Severe chronic toxicity

	Hazard category	
	Category 1	Category 2
Pictogram/ Symbol		
Signal Word	Danger	Warning
Hazard Statement		
Carcinogenicity	May cause cancer	Suspected of causing cancer
Germ cell Mutagenicity	May cause genetic defects	Suspected of causing genetic defects
Reproductive toxicity	May damage fertility or the unborn child	Suspected of damaging fertility or the unborn child
Colour band	PMS red 199 C	PMS red 199 C

Annex 4 – Using precautionary pictograms

Pictograms should be featured on labels according to the design of the label. All labels should conform to national regulations which must take precedence over any proposals made in this annex.

The pictograms should be printed in black and white, and are best positioned at the bottom of the label.

Their size should be appropriate for the label on which they are to appear. For

labels on bottles of 1 to 5 L, the preferred size is approximately 15 mm x 15 mm, but they should never be smaller than 7 mm x 7 mm.

The pictograms selected for each product label must be appropriate to the safety precautions needed for that product. An important feature of the system is that it permits a distinction between the precautions recommended for handling the concentrate and those recommended for spraying. The examples shown here illustrate these points.

Pictogram showing that pesticides must be **locked away and out of reach of children** should be used on all labels and should appear to the left of the group of pictograms associated with handling the concentrate.

The activity pictogram for **handling the product** in its pack or container should appear to the left of the centre of the label, with associated advice pictograms grouped further to the left. The activity and advice pictograms should be enclosed in a clearly defined "box" to show that they are linked.

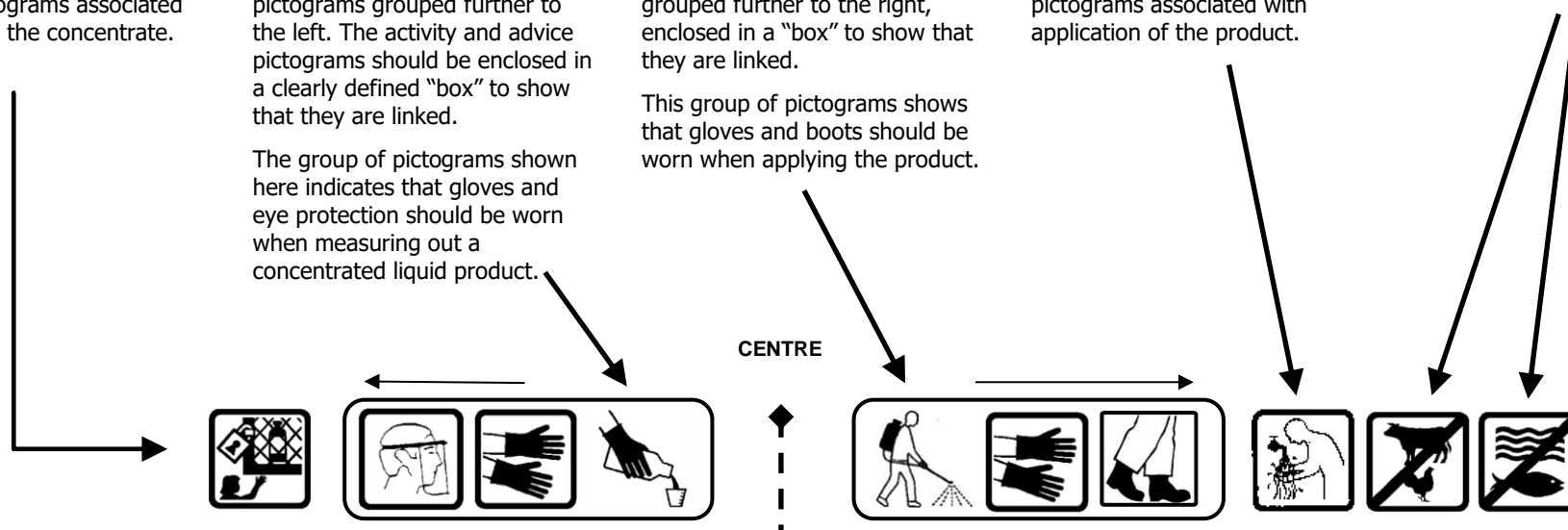
The group of pictograms shown here indicates that gloves and eye protection should be worn when measuring out a concentrated liquid product.

The activity pictogram for the appropriate **method of application** should appear to the right of the centre of the label with advice pictograms grouped further to the right, enclosed in a "box" to show that they are linked.

This group of pictograms shows that gloves and boots should be worn when applying the product.

The pictogram showing that people must **wash after using pesticides** should be printed on all labels and should appear to the right of the group of pictograms associated with application of the product.

The **environmental warning** pictograms, when needed, should appear to the right of the "wash after use" pictogram.



The four sets of illustrations below give further guidance on how the pictograms may be used.

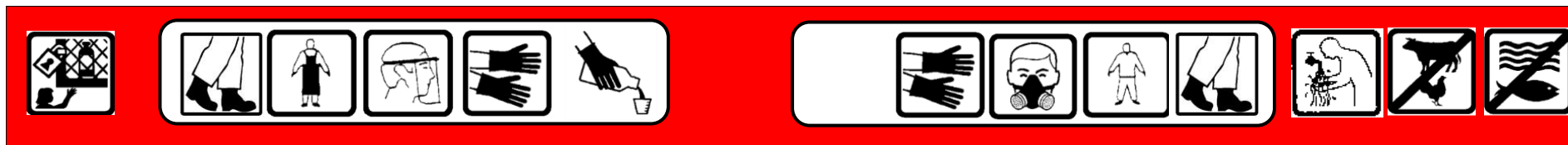
This example contains the maximum number of advice and warning pictograms and shows that protection is required both when handling the concentrate and when applying the product.

The sequence in which advice pictograms should appear, starting from the centre, is: wear gloves; wear eye protection; wear protection over nose and mouth (or wear respirator); wear overall (or wear overalls and apron); wear boots.



If a hazard warning colour band is used on the label, the pictograms can appear on it.

The example shown here is a red band, used for a dangerous product (fatal or with severe chronic toxicity)

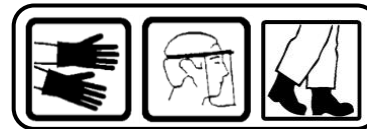


The pictograms used on any pesticide label must illustrate the specific safety advice associated with that product: the lower the hazard associated with the product, the fewer pictograms are necessary.

In this example, the product is less hazardous than the previous two examples, and the number of pictograms used reflects this. Gloves and eye protection are required only when handling the concentrate, which in this case is a solid, and no special protection is required when applying the product.




































For pesticides that are ready to apply and which require no dilution (e.g. granules), an activity pictogram is unnecessary, and only advice pictograms are required. This example shows that gloves, eye protection and boots are required when applying this ready-to-use product.



Annex 5 – Supplementary information on pictograms

This guidance recommends that pesticide distributors, retailers and other pesticide outlets provide the user with information about the meaning of the pictograms on the label. Such information may be provided in the form of brochures, leaflets or laminated cards, preferably in the language(s) of the prospective users. Such leaflets or cards could also be added to the packaging of pesticides.

An example of a pictogram information card, used in South Africa, is given below.

Pesticide Label Pictograms and Colour Codes					
Meanings of Advice & Warning Pictograms					
 Wear Gloves	 Not for aerial application				
 Keep locked away and out of reach of children	 Wear respirator				
 Wash after use	 Dangerous/harmful to fish - do not contaminate lakes, rivers, ponds or streams				
 Wear protection over nose and mouth	 Dangerous/harmful to livestock and poultry				
 Wear boots	 Wear eye protection				
 Dangerous/harmful to wildlife and birds	 Expiry date				
Meanings of Activity Pictograms:					
 Handling liquid concentrate	 Handling dry concentrate	 Application			
<p>Meanings of Colour Codes: listed from the most (1) to the least (4) dangerous.</p> <table border="0"> <tr> <td>1  Very Toxic: Extremely/ Highly hazardous. Protective equipment and clothing MUST be used.</td> <td>3  Caution: Slightly hazardous. Use carefully and use protective equipment.</td> </tr> <tr> <td>2  Harmful: Moderately hazardous. All safety measures stated on label MUST be used.</td> <td>4  Keep Locked Away: All pesticides are poisonous. Store away from children, food and animals.</td> </tr> </table>		1  Very Toxic: Extremely/ Highly hazardous. Protective equipment and clothing MUST be used.	3  Caution: Slightly hazardous. Use carefully and use protective equipment.	2  Harmful: Moderately hazardous. All safety measures stated on label MUST be used.	4  Keep Locked Away: All pesticides are poisonous. Store away from children, food and animals.
1  Very Toxic: Extremely/ Highly hazardous. Protective equipment and clothing MUST be used.	3  Caution: Slightly hazardous. Use carefully and use protective equipment.				
2  Harmful: Moderately hazardous. All safety measures stated on label MUST be used.	4  Keep Locked Away: All pesticides are poisonous. Store away from children, food and animals.				
<table border="0"> <tr> <td style="text-align: center;">  Centre for Occupational and Environmental Health Research (COEHR), University of Cape Town, South Africa. Tel: +27 (0)21 406 6300 </td> <td style="text-align: center;">  <small>This work is licensed under the Creative Commons Attribution-Non-Commercial-Share Alike 2.5 South Africa License. To view a copy of this license, visit http://creativecommons.org/licenses/by-nc-sa/2.5/za/ or send a letter to Creative Commons, 171 Second Street, Suite 300, San Francisco, California 94105, USA.</small> </td> </tr> </table>		 Centre for Occupational and Environmental Health Research (COEHR), University of Cape Town, South Africa. Tel: +27 (0)21 406 6300	 <small>This work is licensed under the Creative Commons Attribution-Non-Commercial-Share Alike 2.5 South Africa License. To view a copy of this license, visit http://creativecommons.org/licenses/by-nc-sa/2.5/za/ or send a letter to Creative Commons, 171 Second Street, Suite 300, San Francisco, California 94105, USA.</small>		
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<p>Contact: oeh-pesticides@uct.ac.za</p>					

Annex 6 - Sample check list for reviewing pesticide labels

Note: This list should be used in conjunction with chapters 3 and 4, as referenced in the table below, and in particular with section 4.15 on “how to check a label”.

Items to be checked (reference to relevant sections of the guidance)	Review notes	Corrections required and deadlines
Product identity / content information (3.1)		
• Product name		
• Product category (e.g. herbicide, insecticide, fungicide)		
• Type of formulation – name and code		
• Active ingredient name		
• Active ingredient content		
• Hazardous co-formulants		
• Net contents		
• Batch number		
• Registration number		
Hazard and safety information (3.2)		
• Hazard symbol(s)		
• Signal word(s) (4.4)		
• Hazard statement(s) (4.4)		
• Precautionary statements (4.5)		
• Precautionary pictograms (4.6)		
• Hazard colour band (4.7)		
• Tactile warning (4.8)		
• First-aid and medical advice (4.9)		
• Product or user category (3.6)		
• Advice on dealing with accidental spills (4.10)		
Directions for use (3.3 and 4.11)		
• Field of use		
• Directions for use		
• Storage and disposal		
Supplier information (3.4)		
Other information (3.5)		
Label layout (4.1)		
Style and format of text (4.2)		
Use of colour (4.3)		
Other information (to be completed by the reviewer)		

Annex 7 – Example of Mode of Action Labelling Guidance

Note: The text of this annex was provided by CropLife International (CLI) representing the pesticide industry.

Mode of Action Labelling

The development of resistance is a critical focus for the crop protection industry. The more farmers use a pesticide with the same mode of action (MoA), without another overlapping MoA and/or non-chemical control measures, the more likely it is that pests will develop resistance. Academics and industry experts agree that sequential applications or applying mixtures of products with different effective MoAs are key strategies to delay the onset of pest resistance.

The crop protection industry understands the consequences of the development of resistance and is proactively taking the lead in addressing the problem. CropLife International with the support of the [fungicide](#), [herbicide](#) and [insecticide](#) Resistance Action Committees (RACs), is advancing the understanding and practice of responsible resistance management. All RACs have communication resources which include websites, training modules, brochures and posters to emphasize the need to increase diversity in pest control, in particular by using several efficient MOAs in sequence or in mixtures.

The inclusion of MoA information on product labels, supported by training and other resources, is critical to ensure growers have the information they need to follow resistance management guidelines. MoA labelling is currently only a regulatory requirement in a small number of countries, however there are strong indications that more countries will make it mandatory in the foreseeable future.

Industry Commitment

To support the widespread adoption of responsible resistance management practices, CropLife International members have voluntarily made a commitment to include MoA icons and groups on all product labels by 2023. The inclusion of MoA information on product labels will ensure growers have simple access to critical information to support implementation of resistance management.

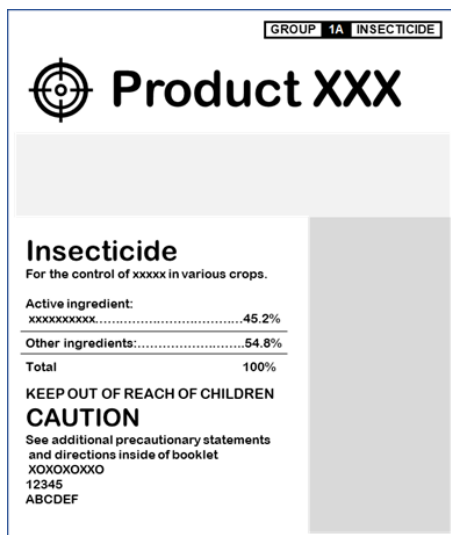
CropLife International encourages all pesticide manufacturers to adopt this MoA labelling icon approach, for managing pesticide resistance and the stability of crop production. CropLife International would encourage pesticide regulatory authorities to consider the mandatory use of the icons and the global icon format or at least allowing them to be voluntarily displayed on the label.

MoA Labelling Guidance

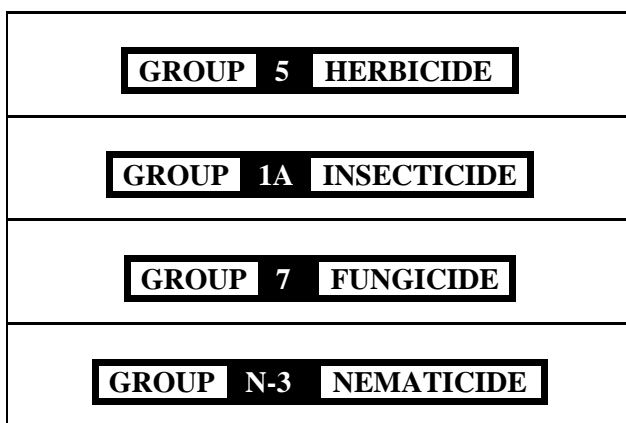
The MoA labelling provides a clear and simple method to inform, pesticide retailers and users, the type of pesticide and its mode of action group. The MoA groups can be used to identify products with the same mode of action; these should not be used repetitively. It is recommended that pesticides are used as part of an IPM strategy in order to maximize pest control and sustainably manage pesticide effectiveness.

Labelling Specifics

It is recommended that the MoA icon is displayed in a prominent position on the label. A position at the top right of the front panel of the label is strongly recommended (see diagram below). A clearly defined font should be used, e.g. Arial or Calibri for users of Latin script. A black and white colour scheme is recommended.



The icon uses the word GROUP in capital letters in black font on a white background; the mode of action letter or numeral should be in white font on a black background; and the word HERBICIDE (or FUNGICIDE or INSECTICIDE or NEMATICIDE) in capital letters in black font on a white background. Both lines, and the whole indicator, are contained within black rectangles. See examples below.



The words GROUP and HERBICIDE, FUNGICIDE, NEMATICIDE or INSECTICIDE (as appropriate) in capital letters which should not be less than one-quarter of the height of the largest letter or numeral on the label and be between 2 mm and 12.5 mm high. (Note: the largest letter or numeral on the label refers to individual words in the label text and not to a dropped capital or other specially formatted single letter.) If more than one pesticide is included in a product then the icon should be written in plural e.g. INSECTICIDES not INSECTICIDE.

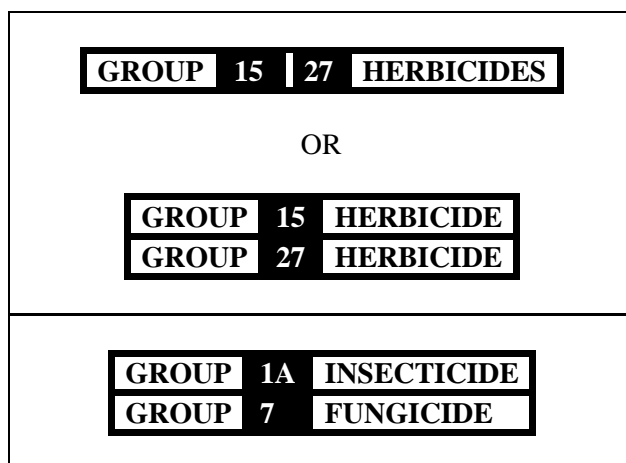
The appropriate letter(s) or number(s) representing the Mode of Action (MoA) group(s) of each active constituent(s) are to be inserted between the words GROUP and HERBICIDE, FUNGICIDE, NEMATICIDE or INSECTICIDE.

The width of the white line that separates the groups for the pesticides in a product with more than one active ingredient should be defined. It should be wide enough so that when the icon is printed on small packets the line is clear.

The letter(s) representing the mode of action should be written in capital letters which should not be less than one-half the height of the largest letter or numeral on the label and between 4 mm and 25 mm high. In any event, the words GROUP and HERBICIDE, FUNGICIDE, NEMATICIDE or INSECTICIDE must be no less than half, and no more than the actual size of the group number or letter.

Note that where a product has two or more active constituents, and these are represented by two or more modes of action, you must use two or more appropriate MoA identifier letters or numbers in a single statement. Alternatively, each individual active ingredient can be placed in a stacked format (see first example below).

If the product contains two or more active constituents which perform different functions, for example, an insecticide and a fungicide. You must show each function separately (that is, one indicator panel for the insecticide and another for the fungicide component). See examples below.



Where required, appropriate translation should be used to ensure MoA labels are clear to product users. Labelling should also consider the FAO/WHO Guidance on Good Labelling Practice for Pesticides. MoA labelling must follow all country regulations and may vary.

Pesticide MOA Group Reference Information

Coding of Insecticides & Nematicides

Insecticide and nematicide MoA should be defined using the IRAC numeric groups from the Insecticide Resistance Action Committee (IRAC) website <http://www.irac-online.org/modes-of-action/>. This is the most up to date source of MoA groups.

Coding of Fungicides

Fungicide MoAs should be defined using the FRAC numeric code from the annually updated list on the Fungicide Resistance Action Committee (FRAC) website (www.frac.info). To find this list, go to <http://www.frac.info/publications/downloads> and select the FRAC Code List. This list is published as PDF and Excel files and information is also presented in a MoA poster. The MoA APP for Android and IOS – can be loaded from Google play store or Apple store.

Coding of Herbicides

HRAC recently changed from a letter-based to a number-based mode of action code system. Herbicides MoAs should be defined using the HRAC numeric groups from the annually updated list on the Herbicide Resistance Action Committee (HRAC) website: <http://hracglobal.com/tools/classification-lookup>.

In the case where countries have already adopted MoA labelling based on letters and have products on the market with letter codes, it is recommended that for an interim period (timeline to be defined by country, where duration is not defined a two year timeline is suggested), both the number and the letter grouping is shown on the label, as illustrated below.

Interim Herbicide MoA Dual Code Labelling	
One single active constituent	Two or more active constituents
GROUP 15 (K3) HERBICIDE	GROUP 15 (K3) HERBICIDE GROUP 27 (F2) HERBICIDE
<i>Include the following statement: Legacy HRAC-codes K3 & F2 in italics</i>	

Countries that have not yet adopted MoA labelling should only use the number grouping on the label when labelling is agreed.

Resistance Management Language for Product Labels

In addition to mode of action number labelling, it is strongly recommended by CLI and the Resistance Action Committees (RACs) to include guidance on the management of resistance on the product label. Where possible companies will voluntarily add resistance management language to their product labels that explains how to use MoA information in resistance management recommendations.

Resistance management guidance for insecticides

The Insecticide Resistance Action Committee (IRAC) recommends that an insecticide resistance management statement be included on all insecticide labels and that the following is incorporated in the text:

- The name of the active ingredient(s) and mode of action identifier (IRAC MoA groups).
- A statement that the product should be rotated with different modes of action using mode of action treatment windows.
- Guidance to avoid treating consecutive generations with the same mode of action

EXAMPLE:

PRODUCT NAME contains the active ingredient **ACTIVE INGREDIENT NAME** and is a Group **IRAC NUMBER** insecticide. The repeated use of **PRODUCT NAME** and insecticides belonging to Group **IRAC NUMBER** against successive generations of the target insects may result in the selection of insects which are resistant to the insecticide. To avoid or delay the selection of resistant insects, insecticides should be used as part of an insecticide resistance management (IRM) strategy which applies the following: Insecticides from the same mode of action group should not be used to treat successive generations of the target pest. If more than one application of an insect control agent is required to control successive generations, then alternative insecticides with different modes of action should be utilized in rotation with **PRODUCT NAME** and by using treatment windows.

- *[Product]* is a Group *N* insecticide
- Do not exclusively use *[Product]* or other Group *N* insecticides to control the same pest throughout the season. Avoid exposing consecutive generations of a pest to the same mode of action by using the “application window” approach which rotates products with different MoA chemistries.
- An “application window” is the period of residual activity that a single application or sequential applications of a MoA provide. It can also be defined as the duration of an insect generation or if unknown, then use an approximate 30 day period. Rotate windows of treatments of *[Product]* and other Group *N* products followed by blocks of treatments with other effective products from different modes of action before returning to Group *N* products.

Resistance management guidance for fungicides

Resistance management guidelines should be presented under a headed section titled: RESISTANCE MANAGEMENT on the label. The following components are strongly recommended by the Fungicide Resistance Action Committee (FRAC).

Include a text statement which includes the following

- Include guidelines and restrictions as published on the FRAC website including such elements as maximum number of applications with the specific cross resistance chemical group permitted during the season, crop cycle, use of mixtures, alternation strategy etc.
- Include a statement which recommends incorporating alternate management tools in fungal management programs. These should include such elements as: the use of resistant/tolerant varieties, the use of correct cultural practices, the use of biologicals and natural compounds in the spray program.

EXAMPLE:

RESISTANCE MANAGEMENT

PRODUCT NAME contains the active ingredient **ACTIVE INGREDIENT NAME** which belongs to FRAC Group **MOA NUMBER** class of fungicides. **PRODUCT NAME** has a specific mode of action and is subject to the development of insensitive strains of fungi. Fungal pathogens can develop resistance to products with the same mode of action when used repeatedly. Because resistance development cannot be predicted, use of this product should conform to resistance management strategies established for the crop and use area. Consult your local or state agricultural authorities for resistance management strategies that are complementary to those in this label. Resistance management strategies may include rotating and/or tank mixing with products having different modes of action or limiting the total number of applications per season. Where possible use resistant/tolerant varieties, cultural practices, biologicals and natural compounds in the spray program. Responsible resistance management is encouraged to ensure effective long-term control of the fungal diseases on this label. **PRODUCT NAME** should not be alternated or tank-mixed with any fungicide to which resistance has already developed.

Resistance management guidance for herbicides

Resistance management label guidance is currently under review by the herbicide resistance action committee (HRAC) and will be communicated later.

Annex 8 – Examples of label information regarding bees and other pollinators

Example 1: A bee hazard icon on US-EPA labels for neonicotinoid pesticides (2013)
(source: <https://www.epa.gov/pollinator-protection/new-labeling-neonicotinoid-pesticides>).

Prior to finalizing its 2017 Policy Mitigating Acute Risk to Bees from Pesticide Products (<https://www.epa.gov/pollinator-protection/policy-mitigating-acute-risk-bees-pesticide-products>), which provides labelling statements to mitigate acute risks to bees from pesticide products, the US-EPA worked with stakeholders to develop the 2013 graphic and supporting labelling to better protect pollinators in the interim. US-EPA previously referenced a “bee advisory box” (available at: <https://www.epa.gov/sites/default/files/2013-11/documents/bee-label-info-graphic.pdf>) and the icon shown below may appear on the label, with information on routes of exposure and precautions against spray drift.



Example 2: A pollinator precautionary pictogram agreed by the CropLife International companies (2021)
(source: CropLife International).

The intention of this pictogram is to warn against spraying when pollinators are active or spraying flowering plants that might be in or close to the crop being sprayed, and attractive to pollinators. On the left is a generalized bee, with two pairs of wings, which represents the honeybee, the Asian honeybee, stingless bees, solitary bees and bumble bees. The insect on the flower on the right represents an adult Syrphid, with one pair of wings, as it is a fly. They are pollinators as adults, but also often predators of aphids as larvae.

Although no specific trigger language/criteria are given, this pictogram could be used when a risk to pollinators is predicted or a hazard trigger is exceeded. This choice could be used if the regulatory authority decides that a pesticide is dangerous or harmful to bees and pollinators and that flowering plants and habitat attractive to them should not be exposed.



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00153 Rome - Italy

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