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International Code of Conduct on Pesticide Management

Guidelines on Good Labelling Practice for Pesticides *(revised)*



August 2015

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on Pesticide Management

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for Pesticides
(revised)

Food and Agriculture Organization of the United Nations
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Abbreviations

a.i.	active ingredient
cfu	colony forming unit
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
IVM	Integrated Vector Management
ISO	International Standards Organization
ITU	International Toxic Unit
IUPAC	International Union of Pure and Applied Chemistry
kg	kilogram
L	litre
LLIN	Long-Lasting Insecticidal Net
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

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

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

Colour band means a band printed at the bottom part of the label of a colour indicating the acute hazard of the pesticide product.

Container means any object used to hold a pesticide product.

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

Formulation means 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 means 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).

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

Integrated Pest Management (IPM) means 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) means 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 means 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.

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

Manufacturer means 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.

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

Pesticide means 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 means all those organizations and individuals engaged in manufacturing, formulating or marketing pesticides and pesticide products.

Pesticide legislation means any laws or regulations introduced to regulate the manufacture, marketing, distribution, labelling, packaging, use and disposal of pesticides in their qualitative, quantitative, health and environmental aspects.

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

Precautionary statement means 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.

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

Release date means 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.

Risk is 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.

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

Symbol means graphical element intended to succinctly convey information.

Toxicity means 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 these guidelines

FAO first published the *Guidelines on Good Labelling Practice for Pesticides* in 1985 [1]. In 1988, an addendum was published that introduced the now widely used pictograms for pesticide labels, developed by GIFAP (now CropLife International) in close collaboration with FAO [2, 3]. A complete revision of the guidelines subsequently came out in 1995 [4].

Since that time, 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* [5] (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) [6]. Furthermore, the labelling of public health pesticides raises specific questions for label content and design [7]. An international seminar held by OECD in 2005 underlined the importance of good labelling for pesticide risk reduction. It discussed a number of problems that still occur in pesticide labels and identified options for improvement [8].

Various studies have been carried out over the last decade which assessed the effectiveness and understanding of pesticide or chemicals labelling, both in industrialized countries [e.g. 9 – 13] and in developing ones [e.g. 14 – 18]. Results of such studies were reviewed and, where relevant and possible, their recommendations have been taken into account in these guidelines. Recent labelling regulations and guidance by major national regulatory authorities were also considered [e.g. 19 – 26], as well as views of the pesticide industry [27].

This present, revised, version of the *Guidelines on Good Labelling Practice for Pesticides* targets pesticide regulatory authorities, primarily in developing countries and countries with economies in transition, which have to define or revise national pesticide labelling requirements. The guidelines aim also to assist pesticide registration authorities in reviewing the design and contents of (draft) pesticide labels. Other stakeholders, such as pesticide industry and civil society groups, may also find the guidelines useful for writing or evaluating pesticide labels.

The guidelines have been brought in line with the GHS, and where the GHS allows for (national) interpretation of its provisions, these guidelines provide specific options relevant to pesticide labelling.

The document contains six chapters with annexes. The first chapter identifies the main objectives and considerations with respect to pesticide labelling. The second chapter briefly introduces the GHS. The third chapter identifies the information which should or may appear on a label. The fourth chapter describes label design, style and contents. The fifth chapter discusses hazard or risk classifications for a product. The final sixth chapter underlines the importance of information provision and training. The annexes contain examples label statements, hazard colour bands, and precautionary pictograms, which can help to clarify the general text.

1.2 Scope

These guidelines concern the labelling of all pesticides, as defined in the Code of Conduct, in any form that is destined to be applied by end-users, except pesticides which are used as human pharmaceuticals

The guidelines do not concern the labelling of pesticides in an industrial setting, i.e. active ingredients, bulk pesticide formulations destined for reformulation, repackaging or disposal, or other pesticide formulation components. Since 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 [6].

Similarly, the contents 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 which accompanies the product is not inconsistent with the approved label.

Furthermore, the UN Recommendations on the Transport of Dangerous Goods – Model Regulations [28] 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” [5].

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” [6].

For the purpose of these guidelines, the first definition will apply.

The label is a mandatory part of the product package. Additional information may be provided by means of a safety data sheet and/or a separate or “fold-out” leaflet which accompanies a container, in which cases these leaflets should be referred to on the label.

1.4 Purpose of the pesticide label

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

The label is the main information source explaining the identity and directions of use of the pesticide, i.e. for what purpose as well as where, 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 risks of its use, 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, also the (minimum) content and format of the label is defined by law. In such cases, all pesticide labels, and any modifications or variations, need to be approved by the responsible authority. As a result, pesticide labels are enforceable and it will be a violation to use a pesticide product in a manner inconsistent with its labelling.

1.5 Responsibilities regarding labelling

The International Code of Conduct on Pesticide Management lists a number of responsibilities and standards of conduct, for both governments and pesticide industry, with respect to pesticide labelling [5].

In general terms, the Code of Conduct 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).

Pesticide industry is addressed in various parts of the Code of Conduct to ensure proper labelling of pesticides that are being sold and distributed nationally, and in international trade:

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 where a control scheme is in operation, pesticide industry should make every reasonable effort to reduce 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" can only be successful if the essential messages on the label are kept 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. There is, therefore, a great need for clear directions and warnings which can be easily understood by all potential users.

The basic regulations affecting label content are national regulatory requirements. In addition to these, there are additional standards within individual companies, and 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 different types of pesticides (e.g. agricultural, veterinary, public health, domestic pesticides) are being regulated by different authorities, there should be effective intersectoral information exchange to ensure that labels are harmonized within the country and avoid confusion among pesticide users. Ideally, the label is the outcome of research on the part of pesticide industry and of evaluation on the part of government regulatory agency 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. Where label or label elements are used in several countries, accurate translation into other languages is necessary. 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.

Despite having the right language(s) on a label, there still remains a considerable number of users who are unable to read a label, in particular in (but not limited to) developing countries. For these users, pictograms which illustrate proper handling or application and the use of protective clothing during application are essential. But even when pictograms are used, great efforts must be made so that they are properly understood by the user. It is recommended that information on the meaning of pictograms, symbols, and colour bands be made available at the point of sale (see examples in Annex 5).

The increased demand for more information on how to use pesticides correctly, and the need for dual languages, hazard symbols and pictograms on labels, creates serious competition for space in label design. The five principles to adhere to in preparing a label are clarity, completeness, comprehensiveness, conformity and consistency.

Clarity is achieved by avoiding complex or excessively technical explanations and by using a clear layout with a prominent display of key words, phrases, symbols, and pictograms. Thus it is important to:

- attract the user's attention;
- tell the user what he/she needs to know in brief and precise terms;
- use locally familiar expressions and symbols; and,
- avoid ambiguous statements.

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

Comprehensiveness is achieved by providing training and information on what pictograms, colour codes and other label elements mean and how to read a label, as well as by conducting user surveys which may result in label improvements.

Conformity is achieved by following existing regulations, standards and guidelines, both national and regional/international.

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

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

There may sometimes be a conflict in the wording required by regulatory authorities on the one hand, and the clear instruction to the pesticide user on the other. Regulatory authorities, however, are generally open to accepting easier to read statements, especially if they are consulted during the preparation of a label.

The writer of the label has 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 piloted in the country of proposed use prior to their use. This will promote better understanding and raise issues that need to 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)* [6] 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 the implementation of the GHS and, where relevant, to amend their respective legal international instruments addressing transport safety, work safety, consumer protection or the 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. GHS is revised on a regular basis; it is also 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 their classification and labelling should in principle follow its provisions.

This revision of the *Guidelines on good labelling practice for pesticides* therefore incorporates the main elements of the GHS, and provides advice on how to apply 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 the hazards arising from the intrinsic properties of the pesticide. The GHS is not intended to harmonize risk assessment procedures and risk management decisions. However, the GHS 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 will be applied. However, when a classification system covers something that is 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 these *Guidelines*, recommendations are therefore given as to which building blocks of the GHS are most relevant to pesticide labelling, and how to implement them. These 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 or the WHO *Recommended Classification of Pesticides by Hazard*, 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 and disposal; and
- supplier identification.

There should be a clear indication 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 Product content information

The following information identifying the contents of the container should appear on all labels:

- a) **Product name**
- b) **Product category** (e.g. herbicide, insecticide, fungicide, etc.).
- c) **Type of formulation** – name and code, according to the International Formulation Coding System [29].
- d) **Active ingredient name** (according to ISO) [30] or other locally used common name, or, in the absence of either, the chemical designation according to IUPAC [31]).

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 content.** This should normally 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). For vaporising mats, contents are expressed as mg/mat

If the active ingredient is a microbial agent, 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 [e.g.,

solvents, 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 promote 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 the 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 hazard and safety 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 cover 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.
- Precautions when handling the concentrate (if applicable).
- Precautions during and after application.
- Environmental precautions during and after application
- A warning against the reuse of containers

Much of the safety advice may be put on the label in the form of standard precautionary statements or warnings (see Annex 2, for examples).

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

e) **Precautionary pictograms**

Precautionary pictograms reinforcing the safety text should be included (see Section 4.6).

f) **Hazard colour band**

A hazard colour band, may be printed at the lower part of the label to indicate the acute toxicity of the formulated product (see Section 4.7).

g) A **tactile warning** for the blind and visually impaired. The word *PESTICIDE* should be printed in Braille on all labels of products which are 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 supplied to the general public which are classified as dangerous (see Section 4.8).

h) **First aid and medical advice**

Labels should carry first aid and medical advice, where relevant (see Section 4.9). Additional information regarding symptoms and antidotes may be added, where appropriate, for particular products.

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

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

i) **Product or user category**

In some countries, pesticide products are classified by product or user categories (e.g. professional use products, restricted use products, household products/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.

j) **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 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 legally used with maximum efficacy and minimum risk. This information may be repeated and/or expanded in a separate/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; targets pests/weeds; situations;
- Dose rate(s);
- Mixing instructions and water volumes, where appropriate. The use of volumes/weights in mixing instruction should preferably be in the same unit as the unit of the container, to avoid potential conversion errors);
- Methods of application; incompatibilities with specific (equipment) materials, where appropriate;
- When to use the product, including: timing and frequency of application; maximum number of applications per season/year; intervals between applications; or when not to use the product;
- Warnings should be included that different pesticides should not be mixed in one spray solution, except in case of a registered tank-mix. Warnings related to phytotoxicity, susceptible adjacent crops, following 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;
- Resistance prevention and management information, including the mode of action (MOA) code of the pesticide [32], where appropriate;
- Instructions for cleaning application equipment and PPE.

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 also be provided:

- A warning against the reuse of containers, except where 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 pesticides;
- Contact information (name of organization, telephone number and email address) for handling environmental incidents such as spills of the product.

3.4 Supplier identification

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

- a) **Local distributor or supplier** name, address, telephone number and email address should always be mentioned on the label. This will often also be registration holder of the product in the country concerned.

In case the **registration holder** and the local distributor/supplier are different, contact details for the registration holder should also appear on the label.

The **manufacturer's name** and other unique identifiers may appear on the label.

3.5 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, the pesticides can only legally be used according to the label. A statutory heading may be included to clarify 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 statement 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 used by a user owning a smart phone to link to further product and risk information (e.g. additional medical advice) on the web site of the pesticide company [41]. However, information provided on a company web site cannot replace the label information that is legally required by a country.
- f) Contact details of the national/regional **poison centre** or other similarly qualified institution.

3.6 Label content and product/user category

In principle, the contents of the label as listed above apply to all categories of products or users. Therefore, labels for restricted use products or general use products, products intended for use by professional users (e.g. farmers, pest control operators) or amateur users (e.g. in home and garden), or products destined for use in agriculture, forestry, disease vector control or in industry), generally consist of the same elements.

However, the level of detail in which these elements are presented on the label may be very different. For instance, 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.

On the other hand, household pesticides, which are bought and used by non-professional users, will generally only be authorized if they are of low hazard. As a result, hazard and safety information will be less substantial and the instructions for use tend to be less broad than for professional use products.

Use simple language, avoid jargon, avoid technical language that may be relevant to agricultural users but not comprehensible for household users.

Labels for public health pesticides and agricultural pesticides will have similar format and contents, but the directions for use sections will be quite different due to the different target pests and application methods.

Specific label elements, not mentioned in the sections above, may apply for special purpose labels, however. 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 individual labels and the use of pictograms.

4.1 Label layout

4.1.1 General

The clear layout of the label contributes greatly to its ease of use, and should be carefully considered during the design by the pesticide company and the 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 of a professional designer may be needed when developing label layout. Some principles of successful label layouts are discussed below.

Information on the label is best broken up into smaller, separate sections. Each block of subject matter should have a clearly understood heading. Generally, the following subject sections 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.

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

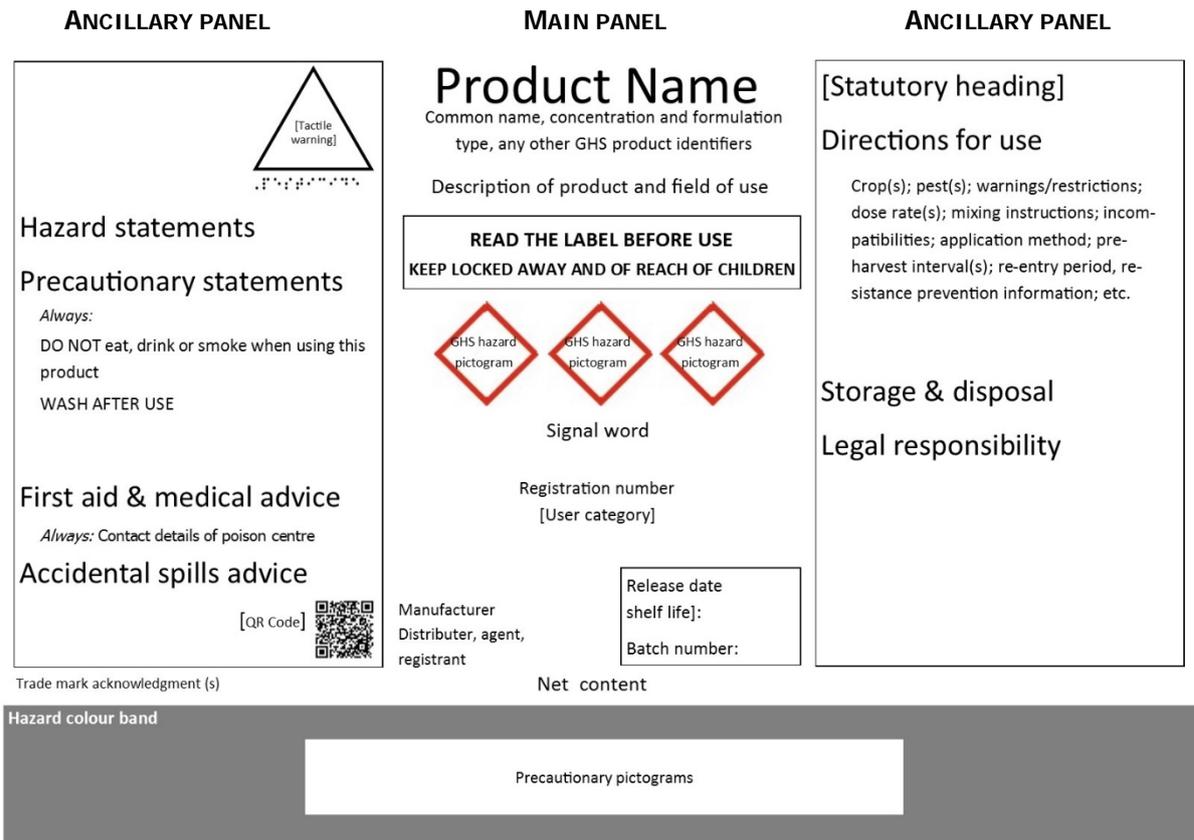
Labels may be laid out with one, two, three or more panels. If label size allows, the three panel layout is preferred. For smaller packages, the primary label may be securely attached to the container, while more detailed information is provided in a separate or “pull-off” leaflet.

4.1.2 Three panel layout

If label size allows, the three panel layout shown below is suggested. The main panel would need to identify the product, its field of use, and provide essential warnings and restrictions, whilst the two other panels can be separately devoted to directions for use, precautionary statements, storage and disposal provisions, and other information.

An example of a 3-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 3-panel label [optional label elements are between square brackets].

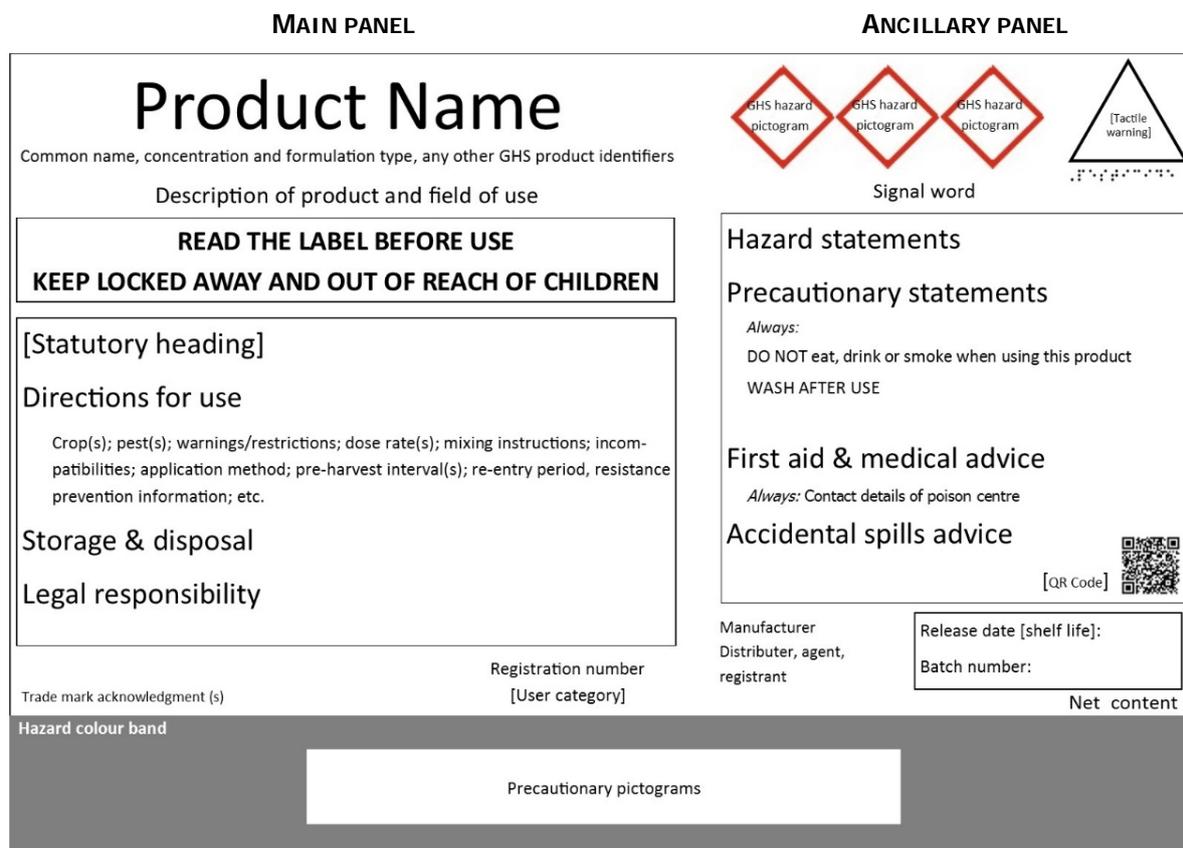


4.1.3 Two panel layout

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

An example of a 2-panel pesticide label layout, with the suggested location of the different label sections/elements, is provided in Figure 4.2.

Figure 4.2 Example of a 2-panel label [optional label elements are between square brackets].



4.1.4 Single panel layout

A single panel label should only be used where the uses of the product are limited and directions for use, warnings and precautionary statements and first aid require little detail. It should not be the sole source of information when the pack size is small. In such circumstances, 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 between square brackets].



4.1.5 Labels for small packs/supplementary leaflets

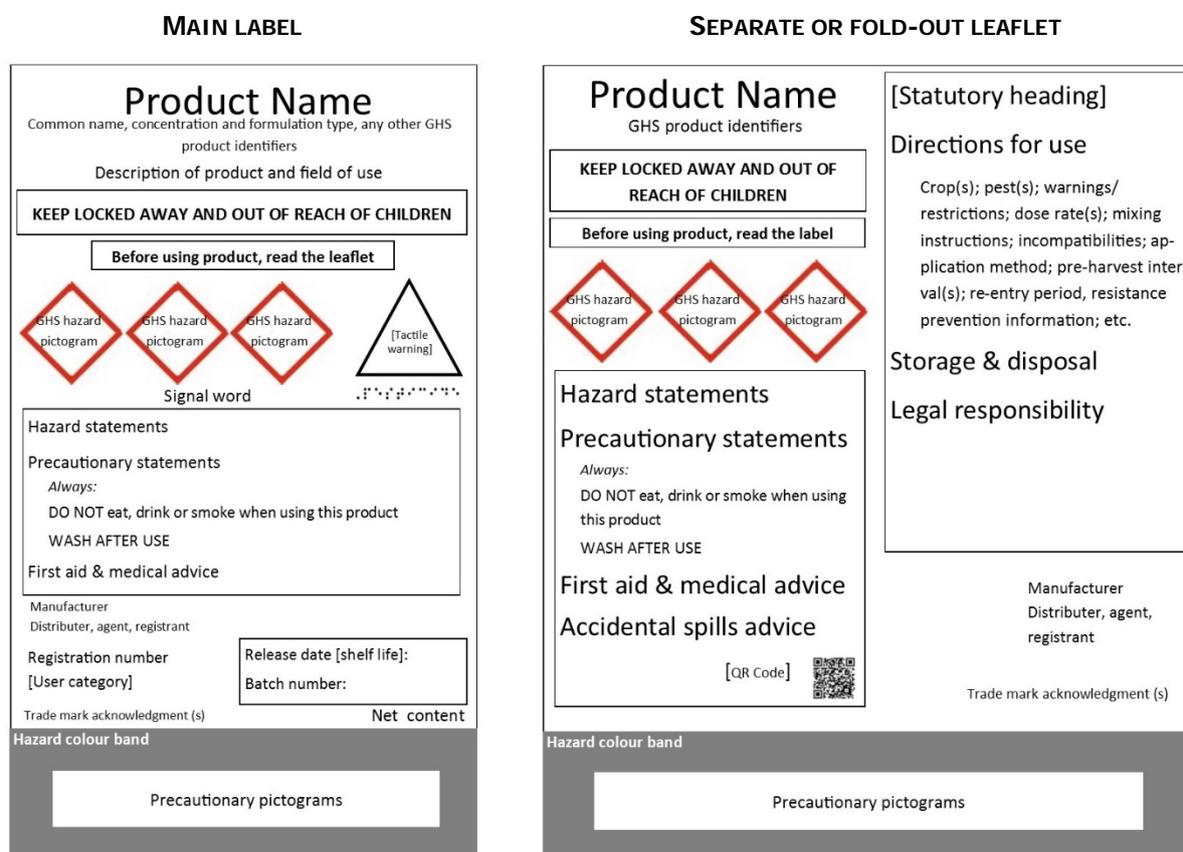
The use of small packs to suit smallholder or household users can present problems with labelling due to the limited space available for text. Some hints at reducing text are given in Section 4.2.3. However, if local or national regulations permit, information can be printed on a separate leaflet or an attached “fold-out” leaflet. The latter folds out when pulled off, but stays attached to the main label on the packaging.

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

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

An example for 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 between square brackets].



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

When a product is packed 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/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 these guidelines. 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/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, other product identity information, etc. are product-specific and apply to all components.

4.1.7 *Dual or multi-language labels*

Where the label is required to be printed in more than one language, each language should have its own complete label. 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. This shortage of space can be overcome by having the primary language on the container label and other languages on an attached leaflet. If possible, key safety information in all required languages should be on the label firmly attached to the container.

The translated labels should be independently verified, 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. Language should be simple, straightforward, without jargon or needless words. Technical language 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 designed so that they are conspicuous, understandable and easy to comply with. Label language will be most effective when it causes action and modifies behaviour: labelling should encourage beneficial behaviours and discourage negative or hazardous behaviours. Examples are:

Label statements discouraging behaviour, e.g.:

- *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, e.g.:

- *Wear gloves with every use*
- *Sweep up spilled product*

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

Mandatory statements relate to the actions that must be followed to ensure the 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 that 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 hour*

Advisory statements provide information to the user on how to maximize efficacy and safety while using the product. Such statements are no 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. The use of words such as “must”, “should”, “do” or “do not” in advisory statements has the potential to lead the product user to erroneously believe that he/she must comply with such statements, when in fact such statements do not have to be followed. 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.*)

The proper understanding of pesticide label text is highly dependent on national linguistic practices 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 should be at least 8-point, and that all other text should be at least 6-point. The preferred size is 11-point. Examples of print size and style are given in Annex 1.
- Highlighting with bold letters is more effective than using capitals.
- The type face selected should be very clear and without decorations or oddities. The print style preferred is Helvetica (European Grotisque) or Modern. Avoid italics, except for Latin names, and even these should be avoided when there is a well-defined 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.
- Wherever possible, the label should be set out in clearly headed distinct blocks making 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*

Since space is usually at a premium on most labels, one way of gaining space, and thus enabling a larger print size to be used, is to reduce text by avoiding unnecessary information, keeping sentences short and precise, and generally making the text as economical as possible, whilst 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 which is not printed on). White space is to be found at the ends of lines, between letters, words, lines and paragraphs, between columns and in borders around the text. Space around blocks of statements and symbols is clearly necessary in many cases, since it is a means of attracting 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 given here:

- Go through the text carefully and reduce long sentences and long words to shorter ones, providing 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 where it is certain they will be understood.
- Move information to less-crowded parts of the label.
- Check relative widths of columns so paragraphs end nearer the column edge.
- Increase the number of columns. This sometimes enables better use of space to be made at the end of short sentences, e.g. in the safety text.
- Use a separate or integral leaflet.
- For texts which need to be translated into another language, it is important to remember that some languages take up more space than others.

Avoid using overstickers to amend label information except where necessary and agreed to by the regulatory authority and the registrant. Where 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), for 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 will generally enhance attractiveness. Showing things in their true colour will increase understanding. Important parts of drawings can be emphasized by contrasting colours. But beware 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

Colour may also be used in the hazard colour bands that are put on the label to indicate the acute toxicity of the product. These are discussed in more detail in Section 4.7. These colours must clearly stand out 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. The 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 the more severe categories and *WARNING* is used for the less severe.

The signal words used for the WHO classification are *VERY TOXIC*, *TOXIC*, *HARMFUL* and *CAUTION*, which is different from the GHS. If the WHO classification is used as a basis for hazard classification, these signal words should be used, and not the ones 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” [6]

If after classification, more than one signal word is called 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 hazard and all relevant signal words apply. Further specific advice on precedence for signal words is given in the GHS [6].

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, as this helps to explain the meaning of the symbol.

4.5 Precautionary statements and warnings

A **precautionary statement** is a phrase which describes the measures that should 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 hazard or risk based. They should appear along with the hazard communication elements discussed above (hazard symbol, signal word and hazard statement).

Precautionary statements are not internationally harmonized, and many countries will 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 based on the identified hazard category [6]. GHS identifies four types of precautionary statements covering:

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

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

Precautionary statements on the pesticide label should be assigned, as a minimum, to cover the hazards or risks identified for the pesticide. Whenever 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

In case PPE should be required for household products, or other products supplied to the general public, the related statements should be made very explicit on the label.

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

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

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

4.6 Use of symbols, pictograms and illustrations

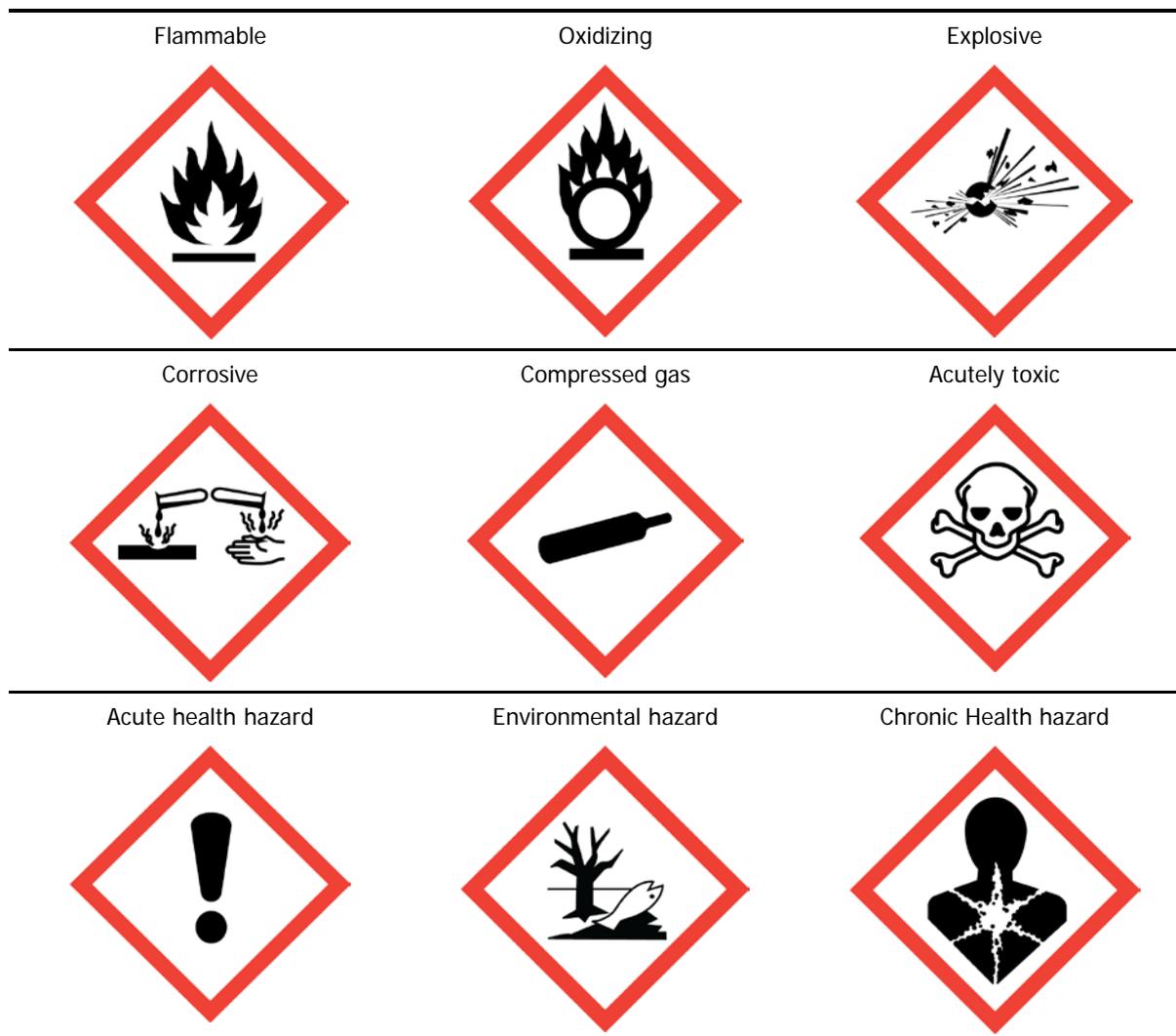
There is usually insufficient space on the label itself to include any illustrations, with the exception of mandatory or suggested **hazard symbol pictograms** and **precautionary pictograms**. A pictogram is a symbol which conveys a message without the use of words. Other illustrations are best confined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

4.6.1 Hazard symbol pictograms

For the purpose of pesticide labelling, hazard symbol pictograms (or hazard symbols) are those pictograms visualizing 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. The exact size of the hazard symbol pictogram will depend on the size of the pesticide container/label, but must not be less than 10 x 10 mm.

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



All these 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.

Whenever 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 visualize the main precautions that should be taken when handling, applying or storing a pesticide. They have been specifically designed for pesticide products. A standard set of precautionary pictograms for pesticide labels has

been devised by GIFAP (now CropLife International) in cooperation with FAO [2, 3]. They describe recommended measures that should be taken to minimize or prevent adverse effects resulting from handling, applying or storing a pesticide. The precautionary pictograms in these guidelines aim to communicate key precautionary information to users in different countries, and with varied levels of literacy.

There are several points to note about the use of precautionary pictograms:

- In some countries, permission from regulatory authorities may be required but, in general, most are encouraging their use.
- Precautionary pictograms should be introduced onto the label when it is first drafted.
- Precautionary pictograms should echo and reinforce precautionary statements. If a precaution appears for which a pictogram exists, the 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 use precautionary pictograms recommended below, unless it is known that the country has successfully developed pictograms reflecting local culture and practices.
- The precautionary pictograms which should appear on all labels are those depicting 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 complete set of precautionary pictograms is given in Figure 4.6. 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 required label text. Therefore, most illustrations (other than pictograms) are best confined to supplementary label leaflets, brochures and posters.

They can be helpful for showing:

- 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 personal protective equipment;
- a sequence of events;

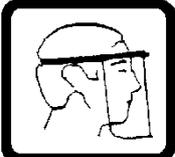
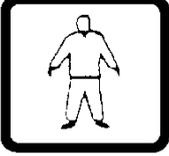
A bar code may also be printed on the label, to allow for easier scanning of prices in retail stores and/or for the traceability of the product within the country.

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

- a food/crop/situation pictured on a label which is not approved;
- pictures of people using a product without the required personal protective equipment;

- pictures of children playing or pregnant women;
- symbols implying safety or non-toxicity, such as a red cross or a medical seal of approval;

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

Type	Pictogram and message		
Storage pictograms	 <p data-bbox="448 651 727 701">Keep locked away and out of reach of children</p>		
Activity pictograms	 <p data-bbox="488 913 687 965">When handling liquid concentrate ...</p>	 <p data-bbox="817 925 1000 976">When handling dry concentrate ...</p>	 <p data-bbox="1099 907 1353 936">When applying pesticide ...</p>
Advice pictograms	 <p data-bbox="528 1178 649 1207">Wear gloves</p>	 <p data-bbox="810 1178 1003 1207">Wear eye protection</p>	 <p data-bbox="1137 1178 1315 1207">Wear rubber boots</p>
	 <p data-bbox="461 1451 715 1503">Wear protection over nose and mouth</p>	 <p data-bbox="831 1451 984 1480">Wear respirator</p>	 <p data-bbox="1155 1686 1299 1715">Wash after use</p>
	 <p data-bbox="520 1704 657 1733">Wear overalls</p>	 <p data-bbox="847 1704 965 1733">Wear apron</p>	
	Warning pictograms	 <p data-bbox="443 1951 735 1980">Dangerous/harmful to animals</p>	

- the Mobius Loop (a recycling symbol in the shape of three chasing arrows forming a triangle) or any other symbol on the printed label implying that the **product** could be recycled when in fact it cannot be. If the packaging can be recycled, then 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 the acute toxicity colour band from clearly standing out.

4.7 Colour bands

FAO introduced a colour band scheme, indicating (mainly) acute health hazards of the pesticide product, which is based on the WHO *Classification of pesticides by hazard* [33]. 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 in the developing world, require these hazard colour bands on their pesticide labels.

Since WHO has amended its classification of pesticides by hazard in 2009, the assignment of colour bands has been adapted accordingly and is therefore slightly different from the previous version of these guidelines (see Annex 3).

A similar colour band scheme has been devised for the GHS acute toxicity classifications (Annex 3).

It is recommended that a colour band is used to denote the acute human health hazard classification, 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 should use the colour band scheme associated with the classification system used, i.e. the WHO-based colour band with the WHO system and the GHS-based colour band with the GHS system, but not mix the two to avoid confusion. It is strongly recommended that the colour band scheme be the same within a region so as to prevent countries selling pesticides with differing hazard colour bands.

4.8 Tactile warnings

Household pesticides or other pesticide products supplied to the general public may be handled by the blind or visually impaired. 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 which are 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 falling in WHO hazard class 1a and 1b, and GHS acute toxicity categories 1 and 2, but 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) [40].



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 concerning 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 doctor/medical staff; advise that poisonings be reported to the appropriate authorities for data collection and highlight on the label if the co-formulants are more hazardous than the a.i. in the product;
- where to obtain further advice.

It 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 so that medical personnel can initiate emergency treatment as soon as the patient arrives (e.g. the antidote and the way of administrating 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 on the label may provide advice to the user on how to clean up accidental spills. The exact measures to take will depend on the type of active ingredient and formulation.

Label statements may include, as appropriate:

- *Keep people away from the spill area*
- *Use personal protective equipment when cleaning up the 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 in empty container that originally held same product or put leaking container into a larger, clearly labelled, container*
- *Contact {emergency phone number} in case of larger spills*

More specialised 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 in the Directions for Use section are outlined in Section 3.3.

In agriculture, directions for use should be according to Good Agricultural Practice (GAP), where applicable. In other fields of use, directions should follow best practices defined nationally or internationally [e.g. 34]. 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 the need to read an attached (enclosed) leaflet before use, if one has been included.

The aim is to ensure the clarity of instructions for the end user. Any applicator, and especially the general consumer, who is a non-technical and occasional applicator, should be able to easily understand and be expected to follow the directions for use. Therefore, all non-essential information should be omitted, such as sales messages, mode of action illustrations, etc.

In many cases graphics (charts, graphs, symbols, or pictures) can be used to help convey information in the Directions for Use section of the label. However, care needs to be taken that the graphics do not contain or imply false or misleading information and they provide accurate information in a clear, concise and complete manner. Subheadings, like paragraph headings in a book, help to organize the 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 more lengthy and complicated information is required, a tabular format 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 within specified IPM or IVM programmes may be included on the label if validated by the regulating authority, and the claim is qualified accordingly.

4.13 Avoiding misleading statements or claims

Certain statements or claims that are misleading, cannot be substantiated, or can easily be wrongly understood, must not be used on the label. These include, but are not limited to, the following types of statements:

- Do not use false or misleading statements concerning the composition of the product.
- Do not use claims as to 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 within 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 other pesticides or substances.
- Do not use superlatives, such as "best", "most effective", "superior control", etc.
- Do not use statements that imply or suggest that the product can or will prevent or control human disease or offer health protection.
- Do not use claims that are inconsistent with efficacy established by testing.
- Do not use statements directly or indirectly implying that the pesticide is recommended or endorsed by the government or a government agency, unless it is explicitly allowed by the competent authority.

4.14 Special purpose labels

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

4.14.1 Bulk material labelling

As indicated in the scope of these guidelines, pesticide materials which are transported in bulk, either for reformulating, repacking or disposal, should have an appropriate label attached. In principle, labelling of bulk pesticides should follow the GHS [6], and a Safety Data Sheet should accompany such shipments.

4.14.2 Chemically treated seeds

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

As a minimum, the following information should appear on the label [39].

- The statement: *Seed treated with* common name(s) of the active ingredient(s)
- Local distributor or supplier name
- The warning: *Do not use treated seed for human or animal consumption or for processing*
- The 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)
- Local distributor or supplier address, telephone number and email address

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

4.14.3 Water-soluble bags

An increasingly popular means of packaging dry pesticides is the water-soluble bag. An important consideration in dealing with soluble packets is how to reduce the likelihood of the user removing unlabelled packets from labelled containers long before use and then forgetting what they are.

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

When printing on the water-soluble bag is feasible, a reduced level of labelling may therefore be acceptable. The following minimum information should be printed on the water soluble bag itself:

- Product name.
- Product registration number.
- The 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 product, read the full label

In all cases, the outer packaging should carry all the information required for the safe and

efficacious use of the product (see Chapter 3). The most widely used packaging is a tear-open foil envelope containing each a water-soluble bag; the foil envelope then should bear the required label information. Another packaging method is a muffin-pan type package where each water-soluble bag is enclosed in a depression with a tear-off top that seals each chamber. The tear-off top then should bear the required label information.

The following phrases should also be put 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 whole bag directly into the spray tank

4.14.4 Insecticides for treatment of mosquito nets

Insecticides intended for treatment of mosquito nets have a slightly different label from agricultural or household pesticides.

The label of the insecticide container should have the following information [35]:

- 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. litre, gram, 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 the blind and visually impaired
- First aid and medical advice
- Accidental spills advice
- Intended dose of active ingredient per square metre 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 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 from 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 presently being sold or distributed are so-called long-lasting insecticidal mosquito nets (LLINs). These nets contain an insecticide coated on, or incorporated into, the netting material.

The following, limited, information should be printed on the label that is attached to the net [35]:

Printed (in indelible ink) on the label attached to the net

- 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



Printed on the bag or as 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)

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

When a draft label is submitted to the regulatory authority, it should be checked on contents, structure, wording, style and quality. This should be confirmed before and after printing.

Contents of the label

- Have all required label elements been included in the label?
- Is all label text presented according to national criteria and regulations?
- Is there enough information on the label to protect the end-user and environment?

- Are the label contents consistent with the labels of similar registered pesticide products?

Structure of information

- Is layout elaborated according to standards presented in these guidelines?
- Are all statements necessary?
- Are headings clear?
- Is information in logical sequence?

Wording of text

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

Print style

- Is the text predominantly black on a white background?
- Does the print size and style conform to the standards?
- Can you read all 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 which 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., reads the same as the approved draft.
- Fold-out labels can be easily read.
- Perforations and other aids are effective.

Quality of material

Where paper is used for labels and packaging leaflets they 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.

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

5. Hazard classification

5.1 Introduction

An important function of the label is that it warns the user of the hazard of the pesticide. Following the GHS, the main elements for hazard communication on the label are the :

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

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

Three types of hazards are generally shown on the 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 follow the GHS, but specifically apply to pesticide labels. In addition, the WHO 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 the registration procedure of a pesticide product. However, it is important to realize the difference between these two processes and how this relates 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, a bag or a box. Hazard classification is based on the intrinsic properties of the pesticide product, and therefore does not take into account the degree of exposure to the pesticide during its use. The hazard classification of a pesticide product may result in the assignment of a hazard symbol, signal word and hazard statement 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, following exposure to a pesticide product during actual conditions of use. The risk of a pesticide therefore depends on the specific local situation and takes into account, for instance, the crop in which the product is applied, the application rate, frequency and equipment, levels of exposure and population most exposed, local environmental conditions, any personal protective equipment used, etc.

Risk assessment will result in a decision whether or not to authorize the use of a pesticide product, as well as the identification of any risk mitigation measures that are required reduce risks to an acceptable minimum. As a result, risk assessment may lead to the definition of precautionary statements and the assignment of precautionary pictograms on the label.

Since hazard classification and risk assessment follow different procedures and serve different purposes, it is well possible that a pesticide product shows certain hazard classifications on its label, but is still authorized for use because the responsible authority considered that the risk of using the pesticide is acceptable (with or without risk mitigation measures). Alternatively, a pesticide may not be classified for certain hazards, but that does not mean that its use is by definition without any risk; use precautions may still need to be followed to limit exposure and minimize risk.

5.3 Physical hazards

It is recommended that the classification of physical hazards of a pesticide product follows the GHS. That is, classification criteria and label elements (hazard symbol, signal word and hazard statement) are those defined in the GHS. However, not all physical hazards described in the GHS are relevant to pesticides, because substances would not be authorized as a pesticide if they would pose such hazards (e.g. explosive substances or self-reactive substances). Table 5.1 provides further 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 as well as for label elements recommended for the various hazard categories [6].

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

5.4 Health hazards

Two international classification systems for health hazards of pesticides are presently in use, the GHS [6] and the WHO *Recommended classification of pesticides by hazard* [33]. 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. Therefore, health hazard classifications by both systems are discussed below.

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 should in principle be classified, not the active ingredient, although for chronic health hazards generally only data on the active ingredient will be available (and can therefore be used). Reference should be made to the GHS for the criteria for classification of health hazards [6].

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	

In case 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 applies for one of the hazards, the exclamation mark for another hazard should not appear;
- If the corrosive 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 appear on the label, though. 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	Pesticides which show germ cell mutagenicity are unlikely to be authorized for use in many countries. However, if they are authorized, appropriate hazard labelling should be carried out.
3.6	Carcinogenicity	No	Pesticides which are carcinogenic are unlikely to be authorized for use in most countries. However, if they are authorized, appropriate hazard labelling should be carried out.
3.7	Reproductive toxicity	No	Pesticides which are a reproductive toxicant are unlikely to be authorized for use in most countries. However, if they 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	Pesticides which result in specific target organ systemic toxicity after chronic exposure are unlikely to be authorized for use in most countries. However, if they are authorized, appropriate hazard labelling should be carried out.
3.10	Aspiration hazard	Yes	

It is **not recommended** to mix the GHS classification with the WHO classification for pesticide labelling (for instance, the WHO classification for acute toxicity should not be combined with the GHS for other health hazards). To avoid possible conflicts in classification and confusion for users, **either** the GHS **or** the WHO classification should be applied to classify and assign label elements for all health hazards in a given country.

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

5.4.2 WHO hazard classification

The WHO recommended classification of pesticides by hazard [33] is primarily used to classify a pesticide according to acute toxicity (Table 5.3). The WHO classification also covers the chronic hazards of some pesticides (e.g. carcinogenicity, reproductive toxicity), as far as internationally acceptable evaluations are available. It does not systematically review chronic hazards of all pesticides, however.

The WHO classification applies different classification criteria and classes from the GHS.

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

For labelling purposes, the **pesticide formulation** or end-user product should in principle be classified, not the active ingredient. although for chronic health hazards generally only data on the active ingredient will be available (and can therefore be used). Reference should be made to the WHO *Recommended classification of pesticides by hazard* for the criteria for classification of health hazards [33].

It is **not recommended** to mix the WHO classification with the GHS classification for pesticide labelling (for instance, the WHO classification for acute toxicity should not be combined with the GHS for other health hazards). To avoid possible conflicts in classification and confusion for users, **either** the GHS **or** the WHO classification should be applied to classify and assign label elements for all health hazards in a given country.

Table 5.3 Health hazards as defined in the WHO *Recommended classification of pesticides by hazard* and their likely relevance for pesticide labelling

Hazard	Likely to be indicated on a pesticide label?	Remarks
Acute toxicity <ul style="list-style-type: none"> • oral • dermal 	Yes	
Other short-term hazards: <ul style="list-style-type: none"> • Skin corrosion/irritation • Serious eye damage/eye irritation • Respiratory or skin sensitization • Aspiration hazard • Specific target organ systemic toxicity – single exposure 	--	Not covered by the WHO Classification
Chronic hazards: <ul style="list-style-type: none"> • Carcinogenicity • Mutagenicity • reproduction toxicity • Specific target organ systemic toxicity – repeated exposure 	No ²	Partially covered by the WHO Classification Pesticides which have high chronic toxicity as indicated in the WHO classification, are unlikely to be authorized for use in many countries. However, if they are authorized, appropriate hazard labelling should be carried out.

5.4.3 Transition from WHO to GHS

The GHS is increasingly being adopted by individual countries and by international organizations for the classification and labelling of chemicals. Harmonized classification and labelling, both across borders and across chemical groups, is important to improve comprehension of chemical risks and facilitate trade in chemical products. FAO and WHO therefore recommend the progressive adoption of the GHS for classification and labelling of pesticides. However, many countries still apply the WHO *Recommended classification of pesticides by hazard*. This is why both systems have been discussed in the sections above.

Countries that wish to make the transition from the WHO classification to the GHS for pesticide labelling should best do so at a fixed date and for all pesticide labels at the same time. However, sufficient advance warning should be provided to pesticide manufacturers and distributors for them to be able to 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 the regulator to inform pesticide users about any changes in hazard symbols, signal words and hazard statements.

WHO amended its classification in 2009, to bring it more in line with the GHS, although the two systems are not identical. Countries that still apply the old, WHO 2004 classification and wish to implement the GHS for pesticide labelling are recommended to do so directly, and not apply the WHO 2009 classification as an intermediate solution. The latter would result in two subsequent changes of classification and labelling which leads to increased costs for pesticide industry and likely increased confusion among pesticide users.

A particular complication may occur in 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. Since Safety Data Sheets (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 recommendable and should be addressed during the preparation of the transition.

5.5 Environmental hazards

At present, only hazards to the aquatic environment and hazards to the ozone layer are classified by the GHS. No other environmental hazards are covered (Table 5.4)

Table 5.4 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 should in principle be classified, not the active ingredient. Reference should be made to the GHS for the criteria for classification of environmental hazards [6].

In case 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 result in specific precautionary statements and pictograms to be included on the label. This will apply to the hazards covered by the GHS but also to a much wider range of environmental risks, such as possible adverse effects on birds, wildlife, livestock, bees, natural enemies of pests, soil organisms and processes, groundwater, etc.

6. Information, training and compliance

The pesticide label is an essential tool to provide information on judicious and effective use of a pesticide. However, pesticide labels and/or pictograms in themselves are often insufficient to ensure that pesticides are used as intended, all necessary safety precautions are taken or the proper emergency response is chosen [11 – 18]. Problems with comprehension tend to be even greater when 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. When populations who have limited literacy and formal education levels need to be reached, various risk communication strategies should be employed. Examples are: popularly used media, posters in locations where pesticides are purchased, bill boards, sides of public transport, walls and buildings where appropriate, laminated cards in local language(s) explaining what the label information means (Annex 5). Training and education are essential factors to increase users’ comprehension of labels [e.g. 36, 37]. Without regular information provision, training and education of pesticide users, even the best designed labels are likely to be ineffective [38].

Both governments and pesticide industry should consider setting up systems which allow pesticide users to be regularly informed and trained about proper pesticide use and pesticide risks, including how to read and use pesticide labels. This is of particular importance when certain important label elements, such as pictograms, are newly introduced. A more sustained approach would be to introduce a subject on how to read the pesticide label in the school curriculum.

Finally authorities should ensure that their inspection and enforcement activities include evaluating for compliance of the label with national regulations and develop ways to identify non-compliant, illegal and counterfeit pesticides through the careful examination of the label. Inspectors should also report problems with labels and label comprehension to the appropriate authorities in order to improve on their effectiveness.

References

- [1] **FAO. 1985.** *Guidelines on good labelling practice for pesticides.* Food and Agriculture Organization of the United Nations, Rome.
- [2] **FAO. 1988.** *Pictograms for pesticide labels – an aid to the safe handling of pesticides.* Food and Agriculture Organization of the United Nations, Rome.
- [3] **GIFAP. 1988.** *Pictograms for agrochemical labels – an aid to the safe handling of pesticides.* Groupement International des Associations Nationales des Fabricants de Produits Agrochimiques, Brussels.
- [4] **FAO. 1995.** *Guidelines on good labelling practice for pesticides.* Food and Agriculture Organization of the United Nations, Rome.
- [5] **FAO/WHO 2014.** *International code of conduct on pesticide management.* Adopted by the thirty-eighth session of the FAO Conference in June 2013. Food and Agriculture Organization of the United Nations, Rome & World Health Organization, Geneva. [Available at: <http://www.fao.org/agriculture/crops/thematic-sitemap/theme/pests/code/en/>]
- [6] **UNECE. 2013.** *The Globally harmonized system of classification and labelling of chemicals (GHS)* Fifth revised edition. United Nations Economic Commission for Europe, Geneva,. [Available at: http://www.unece.org/trans/danger/publi/ghs/ghs_welcome_e.html]
- [7] **WHO. 2003.** *Draft guidelines on the management of public health pesticides.* Report of the WHO Interregional Consultation, Chiang Mai, Thailand, 25-28 February 2003. World Health Organization, Geneva.
- [8] **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. Organisation for Economic Co-operation and Development, Paris. [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)]
- [9] **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
- [10] **Davies S, Haines H, Norris B & Wilson JR. 1998.** Safety pictograms: are they getting the message across? *Applied Ergonomics* 29(1): 15-23
- [11] **EC. 1999.** *Study on comprehensibility of labels based on Directive 88/379/EEC on dangerous preparations.* European Commission, DG III, Brussels.
- [12] **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]
- [13] **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
- [14] **Tourneux H. 1994.** L'interprétation paysanne des pictogrammes phytosanitaires. *Agriculture et Développement* 1 : 39-42
- [15] **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

- [16] **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
- [17] **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
- [18] **Rother H-A. 2008.** South African farm workers' interpretation of risk assessment data expressed as pictograms on pesticide labels. *Environmental Research* 108: 419-427
- [19] **EC. 1991.** Council Directive 91/414/EEC of 15 July 1991 concerning the placing of plant protection products on the market (and subsequent amendments). European Community, Brussels. [Available at: <http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1413956729860&uri=CELEX:31991L0414>]
- [20] **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. European Community, Brussels. [Available at: <http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1413956791421&uri=CELEX:31999L0045>]
- [21] **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. European Community, Brussels. [Available at: <http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1413956855748&uri=CELEX:32008R1272>]
- [22] **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. European Community, Brussels. [Available at: <http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1413956906073&uri=CELEX:32009R1107>]
- [23] **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. (e-CFR accessed on 7 September 2010) [Available at: <http://www.ecfr.gov/cgi-bin/text-idx?SID=ca635b82c0327946ef743ad22e827466&mc=true&node=pt40.24.156&rgn=div5>]
- [24] **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/>]
- [25] **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>]
- [26] **PSD. 2014.** The labelling handbook. Health and Safety Executive, York [Available at: <http://www.pesticides.gov.uk/approvals.asp?id=872>]
- [27] **CropLife International. 2012.** The implementation of the Globally Harmonised System of Classification and Labelling of Chemicals and labelling of crop protection products. Position paper. CropLife International. Brussels. [Available at: <http://croplife.org/crop-protection/regulatory/product-management/globally-harmonized-system-of-hazard-classification-and-labeling/>]

- [28] **UN-ECE. 2013.** *UN Recommendations on the transport of dangerous goods – Model regulations.* 18th revised edition. United Nations Economic Commission for Europe, Geneva. [Available at: http://www.unece.org/trans/danger/publi/unrec/rev13/13nature_e.html]
- [29] **CropLife. 2008.** *Catalogue of pesticide formulation types and international coding system.* 6th edition, revised May 2008. Technical Monograph n°2. Crop Life International, Brussels. [Available at: <http://croplife.org/wp-content/uploads/2014/05/Technical-Monograph-2-Revised-May-2008.pdf>]
- [30] **ISO. 1981.** *Common names for pesticides and other agrochemicals.* ISO Standard 1750 (including amendments). International Organization for Standardization, Geneva.
- [31] **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. [Links at: <http://old.iupac.org/publications/books/seriestitles/nomenclature.html>]
- [32] **FAO. 2012.** *Guidelines on prevention and management of pesticide resistance.* Food and Agriculture Organization of the United Nations, Rome. [Available at: <http://www.fao.org/agriculture/crops/thematic-sitemap/theme/pests/code/list-guide-new/en/>]
- [33] **WHO. 2010.** *The WHO recommended classification of pesticides by hazard and guidelines to classification 2009.* World Health Organization, Geneva [Available at: http://www.who.int/ipcs/publications/pesticides_hazard/en/index.html]
- [34] **WHO. 2006.** *Pesticides and their application – For the control of vectors and pests of public health importance.* 6th edition. World Health Organization, Geneva [Available at: http://whqlibdoc.who.int/hq/2006/WHO_CDS_NTD_WHOPEP_GCDPP_2006.1_eng.pdf]
- [35] **WHO (2012)** Guidelines for procuring public health pesticides. Document WHO/HTM/NTD/WHOPEP/2012.4. World Health Organization, Geneva [Available at: http://whqlibdoc.who.int/publications/2012/9789241503426_eng.pdf?ua=1]
- [36] **Wogalter MS, Sojourner RJ & Brelsford JW. 1997.** Comprehension and retention of safety pictorials. *Ergonomics* 40: 531–542.
- [37] **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
- [38] **DTI. 2002.** *The impact of labelling schemes.* Department of Trade & Industry, London.
- [39] **ISF (2014)** Guidelines on labelling treated seed. May 2014. International Seed Federation, Nyon. [Available at: <http://www.worldseed.org/isf/publications.html>]
- [40] **ISO (1997)** Packaging – Tactile warnings of danger – Requirements. ISO Standard 11683. Second edition, corrected version 1998-09-01. International Organization for Standardization, Geneva.
- [41] **ISO (2015)** Information technology – Automatic identification and data capture techniques – QR Code bar code symbology specification. ISO/IEC Standard 18004. Third edition. International Organization for Standardization, Geneva.

Annex 1 – Print size and style guide

The right hand edge of this sheet 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 Lp). This text is 11 point (pt).

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 which may not be read in perfect conditions, 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 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. Bold print can be used at this size but not below		8 point (2 mm)
This is an example of 10 point print which is easy to read for most people in 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 2pt 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 persons submitting labels for approval, and are based on knowledge of the chemical, its formulation, uses, toxicity and potential hazards. The final decision concerning the acceptance of these proposals is, however, the responsibility of the registration authority. The statements used must convey understanding of potential hazard in a clear, concise way and in a minimum of words.

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

B. Signal words and hazard statements

Signal words and hazard statements are directly determined by the hazard classification of the pesticide product. They are internationally highly standardised (see Chapter 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” [6].

C. Precautionary statements

Precautionary statements are not internationally harmonized, but tend to be defined at the national level. The required precautionary statements are often defined by risk assessments conducted during the pesticide registration process and aim to mitigate the identified risks.

The GHS provides suggestions for precautionary statements and associates them with specific hazard classes of a pesticide. The GHS precautionary statements are not repeated here, but the reader is referred to Annex 3 of the GHS “Purple Book” [6] for further information.

Listed 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 the above precautionary statements are slightly different from the GHS versions, as they are more specifically addressing pesticides.

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 [6] provides suggested prevention and response statements that are also applicable to pesticides.

Health hazards and risks

The appropriate precautionary statements for 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 [6] provides suggested prevention and response statements that are also applicable to pesticides.

In addition, the following examples of precautionary statements are not listed in the GHS but 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 ... days/weeks before harvest.*
- *DO NOT treat/apply to stock later than ... 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 [6] provides only very few suggested 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 ... 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 farm yards and roads.*
- *To protect aquatic organisms/non-target plants/non-target arthropods/insects respect an unsprayed buffer zone of (distance to be specified) to 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 ground water 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 [6] provides suggested precautionary statements that are also applicable to pesticides.

In addition , the following examples of precautionary statements are not listed in the GHS but 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 [6] provides only a few suggested precautionary statements that are also applicable to pesticides.

In addition, the following examples of precautionary statements are not listed in the GHS but 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 contact}*
- *Wastes resulting from the use of this product must be disposed of at an approved waste disposal facility.*
- *Triple-rinse empty container and spray out over treated field.*
- *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 practiced statements are given in the GHS.

The following examples of precautionary statements for specific agricultural practices may therefore 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 dust exposure.*
- *Avoid transfer of dust from the seed bag into the sowing machine.*
- *Do not treat the previously seeds with additional products.*

At sowing outdoors

- *Adequate seed drilling equipment shall be used to ensure a high degree of incorporation in soil, minimisation of spillage and minimisation of dust emission.*
- *Sow at the recommended seeding rate.*
- *To protect birds and mammals, treated seeds must be covered by soil, also at row ends.*

After sowing

- *Do not leave empty bags or left-over treated seed in the environment. Dispose them accordingly to local legislation.*
- *Ensure that left over treated seeds is returned to their original bags and do not use empty seed bags for other purposes.*

Baits

- *Remove any spillage.*
- *The baits must be securely deposited in a way so as to minimise the risk of consumption by other animals. Secure bait blocks so that they cannot be dragged away by rodents.*
- *Treatment area must be marked during the treatment period.*
- *Dead rodents must be removed from the treatment area each day during treatment. Do not place in refuse bins or on rubbish tips.*
- *Remove all baits after treatment is completed.*

Care of equipment

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

Annex 3 – Hazard colour bands

This annex contains the acute hazard classifications of the GHS [6] or the WHO [33], and the recommended associated hazard colour bands. Codes for the colour bands below refer to the PMS colour matching system, mainly used by printers, and devised and patented by Pantone Inc, USA. It is recommended that hazard colour bands are printed horizontally at the bottom part of the label.

Depending on the hazard classification system applied in a country, the responsible authority should assign the colour bands either according to the GHS or the WHO classification, but not mix them.

GHS – Acute toxicity

	Hazard category					
	Category 1	Category 2	Category 3	Category 4	Category 5	Not classified
Pictogram					<i>No symbol</i>	<i>No symbol</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 Green 347 C

WHO – Acute toxicity (and for a limited number pesticides also chronic toxicity)

	Hazard class				
	Class Ia <i>Extremely hazardous</i>	Class Ib <i>Highly hazardous</i>	Class II <i>Moderately hazardous</i>	Class III <i>Slightly hazardous</i>	Class U <i>Unlikely to present acute hazard in normal use</i>
Hazard symbol				<i>No symbol</i>	<i>No symbol</i>
Signal word	Very toxic	Toxic	Harmful	Caution	<i>No signal word</i>
Colour band	PMS red 199 C	PMS red 199 C	PMS Yellow C	PMS Blue 293 C	PMS Green 347 C

Annex 4 – Using precautionary pictograms

How to use the pictograms

The pictograms should be featured on labels in the best way to suit the design of the particular 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 most conveniently located 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 litre capacity, 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 specific product. An important feature of the system is that it permits a distinction to be made between the precautions recommended when handling the concentrate and those recommended when spraying. The examples shown here illustrate these points.

The pictogram showing that pesticides must be **locked away 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 to the left of it. The activity and advice pictograms should be enclosed in a clearly defined "box" to show they are linked.

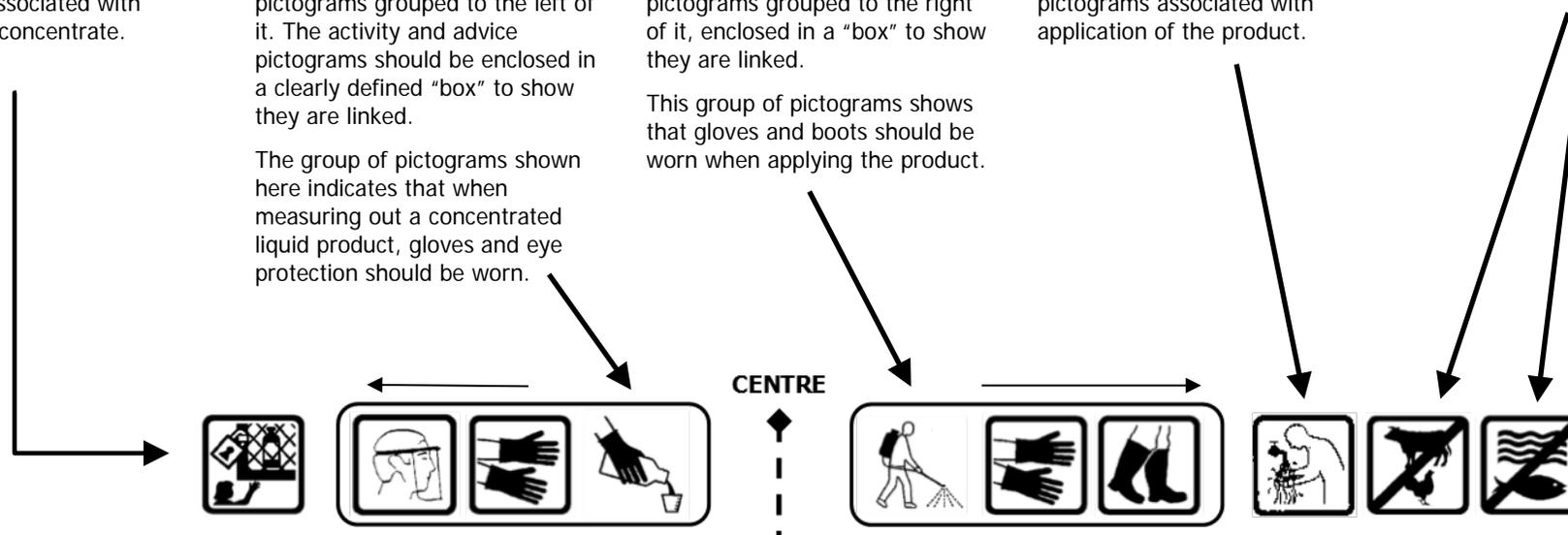
The group of pictograms shown here indicates that when measuring out a concentrated liquid product, gloves and eye protection should be worn.

The activity pictogram for the appropriate **method of application** should appear to the right of the centre of the label with associated advice pictograms grouped to the right of it, enclosed in a "box" to show 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 they are needed, should appear to the right of the "wash after use" pictogram.



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

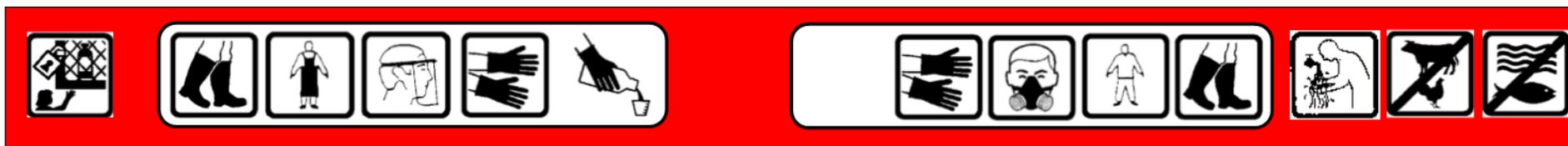
This example contains the maximum number of advice and warning pictograms and shows that protection is needed both when handling the concentrate and when applying the product.

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 within it.

The example shown here is a red band, used for a dangerous product (fatal in GHS classification) or toxic or very toxic product (WHO classification).



It must be stressed that the pictograms used on any individual agrochemical label must relate to the specific safety advice associated with that product: the lower the hazards associated with the product, the fewer the pictograms which are needed.

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 only required when handling the concentrate, which in this case is a solid, and no special protection is required when applying the product.



For pesticides which are ready to apply and which require no dilution (e.g. granules), there is no need for an activity pictogram to appear on the label – advice pictograms only 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

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

An example of pictogram information cards, used in South Africa, are 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
Meanings of Colour Codes: listed from the most (1) to the least (4) dangerous.		
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.	
 <p>Centre for Occupational and Environmental Health Research (COEHR), University of Cape Town, South Africa. Tel: +27 (0)21 406 6300</p>	 <p>This work is licensed under the Creative Commons Attribution-NonCommercial-ShareAlike 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.</p>	
<p>Contact: oeh-pesticides@uct.ac.za</p>		

GHS PICTOGRAM SYMBOLS AND MEANINGS

The United Nations Global Harmonized System of Classification & Labelling of Chemicals (GHS) is a new system with the objective of harmonizing information on labels & Safety Data Sheets (SDS). The goal is to improve the protection of human health & the environment.

	ACUTELY TOXIC: Exposure to this chemical can cause immediate health problems.		ACUTE HAZARD This chemical may cause immediate health effects/reactions if exposed to it.
	FLAMMABLE: A flammable chemical is one that can easily catch fire and burn.	 Skin Irritant	ACUTE HAZARD This chemical may cause immediate health effects/reactions, such as skin rashes and irritation, if exposed to it.
	ENVIRONMENTAL HAZARD: This is a chemical that can damage or kill fish or other aquatic organisms.		CHRONIC HAZARD: Prolonged or repeated exposure to this chemical may cause long term health effects as cancer or birth defects.
	EXPLOSIVE: This chemical is one that can blow up and cause an explosion.	 Reproductive Hazard	REPRODUCTIVE HAZARD: Exposure to this chemical can cause problems for a person's ability to have children or cause birth defects in offspring.
	OXIDIZING: This chemical can react, even in the absence of air, with other chemicals and cause fire.	 Carcinogenic	CARCINOGENIC: Exposure to this chemical may cause cancer.
	CORROSIVE: This chemical can cause severe damage to eyes, skin, metal and other materials.		COMPRESSED GAS: This chemical is under pressure and may explode if the cylinder is heated or ruptured; and contents may cause burns.
SIGNAL WORDS	DANGER: For more severe hazards that may affect your health if you are exposed to it.	WARNING: For less severe hazards that may affect your health if you are exposed to it.	

For More Info: www.unitar.org/cwm/ghs/pag/pag-7



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