

Pesticide hazards in the workplace and environment

About this sub-section

This sub-section will help us to:

- share our views and members' views about pesticide hazards
- develop a trade union approach to pesticides
- consider the impact of pesticides upon our health and the environment

ACTIVITY What do you and your members think?

AIMS

To help us to:

- discuss members' views on pesticides
- share our own views on pesticides

TASK

In your small group:

1. Discuss what your members said about pesticides in the members' survey, and any similarities and differences in your own views
2. Prepare a list of information that you obtained from the workplace

Elect a spokesperson to report back.

What are pesticides?

"Pesticide means any substance or mixture of substances intended for preventing, destroying or controlling any pest, including vectors of human or animal disease, unwanted species of plants or animals causing harm during or otherwise interfering with the production, processing, storage, transport, or marketing of food, agricultural commodities, wood and wood products or animal feedstuffs, or substances which may be administered to animals for the control of insects, arachnids or other pests in or on their bodies. The term includes substances intended for use as a plant growth regulator, defoliant, desiccant, or agent for thinning fruit or preventing the premature fall of fruit, and substances applied to crops either before or after harvest to protect the commodity from deterioration during storage and transport".

Source: FAO International Code of Conduct on the Distribution and Use of Pesticides, Revised Version 2002

The term 'pests' is used in a broad sense to include animals, plants, fish, as well as insects and insect-type pests, fungi and micro-organisms. Many leaflets and books talk of fungicides, herbicides, insecticides, and the other classes of pesticides as though they were separate categories of chemicals when, in fact, they are *all types of pesticides*. Pesticides are often referred to by other names such as agrochemicals, crop protection products or plant protection products.

The vast majority of pesticides used today are synthetic, manufactured chemicals specifically developed for their poisonous toxic qualities and properties to kill unwanted forms of life. A small number of pesticides, referred to as biopesticides, are based on naturally occurring micro-organisms (bacteria, fungi, viruses and mycoplasmas) and chemical extracts from plants, such as pyrethrum and derris (rotenone). These can be used as alternatives to chemical pesticides.

Pesticides based on genetically modifying natural micro-organisms (GMOs) are now being rapidly developed along with genetically modified crops and animals. The need for GMO pesticides and their safety to humans and the environment are surrounded by controversy. In this IUF Manual, GMO pesticides are *not* treated as a safer alternative to chemical pesticides.

Classification of pesticides

The World Health Organisation's (WHO) Recommended Classification of Pesticides by Hazard is widely recognised and used by governments worldwide. It classifies pesticides as follows:

AC	Acaricide (for mite control)
AP	Aphicide
B	Bacteriostat (soil)
FM	Fumigant
F	Fungicide, other than for seed treatment
FST	Fungicide, for seed treatment
H	Herbicide
I	Insecticide
IGR	Insecticide growth regulator
Ix	Ixodicide (for tick control)
L	Larvicide
M	Molluscicide (for slug control)
MT	Miticide
N	Nematocide (for eelworm control)
O	Other use for plant pathogens
PGR	Plant growth regulator
R	Rodenticide
RP()	Repellant (species)
-S	Applied to soil - not used with herbicides/PGRS
SY	Synergist

Pesticides kill

Pesticides (the suffix '-icide' means *killer*) are poisons designed to kill or control "pests". In addition to their inherent toxicity, many pesticides have other undesirable properties. As the vast majority of pesticides are human manufactured, synthetic compounds - which do not exist naturally - there are often no natural organisms which have evolved to breakdown these poisons into less harmful substances.

As a result, many pesticides are also persistent in the human body, soils and water, and bioaccumulative in food chains and the environment. They are one of the few groups of chemicals deliberately spread in the agricultural workplace and the general environment. These pesticides cross national boundaries, being transported through both air and sea, and accumulate in the environment, particularly in colder climates, as they break down more slowly at lower temperatures. Their persistence and ability to accumulate in body fat also means there are traces in most human beings and all manner of wildlife, even in isolated parts of the globe (far away from their original point of use). For example, levels of persistent organochlorine pesticides (e.g. DDT) - in excess of World Health Organisation safety limits - are found in the breast milk of Inuit women in the Arctic.

There is no such thing as 'safe use' of pesticides, only sound management.

Information on pesticides

Workers often have difficulty in finding out about the pesticides they use or are exposed to and the prevention and control measures needed. The range of pesticide products can be bewildering and the same chemical is often referred to by a variety of terms which can be very confusing.

Later in this Manual, there are specific materials that are designed to help you and your members find out and understand the information that you need to track a pesticide in order to prevent or minimise the risks. We will look at:

- the main ways of classifying pesticides in more detail
- what is in a can or packet
- formulation, labelling, product safety data sheets, risk assessments, and other sources of information which are vital for workers to find out about a pesticide

Where are pesticides used?

Agriculture

Commercial agriculture/horticulture is the main area of use of pesticides. The more intensive the agricultural production, the greater the use of pesticides. The control of diseases, insects and weeds in agricultural crops is the prime objective, but pesticides also play an important role in livestock, poultry and fish farm production, as well as crop and fibre storage.

In horticulture, high value produce, combined with the need for quality, often means intensive, programmed pesticide use and it is no accident that pesticide resistance problems develop most rapidly in glasshouses and polythene tunnels. The use of persistent, systemic pesticides can cause

pesticide residue problems in fruit, salad and vegetables. Pesticides however are also being increasingly used in smaller-scale, even subsistence-type, agriculture.

Pesticides play a central role in livestock and poultry production to help:

- control of flies, lice, mice, rats, mice etc. in and around livestock houses/areas
- control of external parasitic pests (ectoparasites) on livestock including fish/shrimps. Pesticides used for this purpose are applied externally to the animals' skin (including fish), and are often legally re-classified as 'animal/veterinary medicines'

Huge areas of forest land may be routinely treated with pesticides, often from the air. Insecticides are often routinely sprayed from the air for control of caterpillar pests.

Preventing *crop losses in storage* and during shipment/transport is another important area of agricultural pesticide use. Insecticides, rodenticides and pesticide fumigants are widely used to control fungal and insect pests in bulk crop/commodity storage warehouses/silos, as well as ship and aircraft holds and container lorries.

Public Health Programmes

Pesticides are routinely used in public health programmes for control of human diseases, especially in rural areas. A wide range of 'animals' (a term which also covers insects and insect-type pests in this instance) act as carriers (vectors) in the transmission of disease from humans to humans and from animals to humans.

Common examples of diseases spread by vectors from human to human include malaria (mosquitoes), trypanosomiasis or sleeping sickness (tsetse fly), river blindness and bilharzia.

Diseases capable of being transferred from animals to humans are referred to as 'zoonoses'. Examples of insect/rodent diseases transmitted from animals to humans include leptospirosis or Weil's disease), salmonellosis, plague, typhus and haemorrhagic fever.

Vector control often involves large-scale, compulsory pesticide application programmes in and around agricultural workplaces including housing/living quarters and food stores. DDT, a toxic and persistent insecticide, is still widely used, for example, for control of malaria-carrying mosquitoes. Pesticide-treated bed-nets are also used.

Other uses

Pesticides are also used for preservation purposes, such as wood preservatives, for example against termites. Amenity and industrial weed control is also another major area of pesticide use. Some pesticides are also approved, on a country by country basis, for aquatic use to control harmful species of fish, aquatic weeds and on the banks of lakes, rivers and canals.

Concerns about pesticides

The scale of ill health

The exact scale of the problem of acute human ill health from pesticides is still largely unknown. The precise number of fatalities, poisonings and incidents is not known due to chronic under-reporting in all parts of the world. Accident and disease reporting systems, and incentives to report them, are generally inadequate for all sectors of industry. Exposure to pesticides constitutes a major occupational hazard that can result in poisoning and death and, in certain cases, work-related cancers and reproductive problems. The World Health Organisation (WHO) estimates that, at a minimum, 40,000 people die annually from pesticides and a further 3-4 million are severely poisoned, especially in developing countries where the more toxic materials continue to be widely used and easily available.

Pesticide use in developing countries

Developing countries use 20% of the pesticides, but have 80% of the fatalities and poisonings. In these countries, and countries with economies in transition (ex- Soviet bloc countries in Central and Eastern Europe, Central Asia), many highly toxic pesticides are used on farms and in plantation crops and new export crops like cut flowers and fresh vegetables. Some industrialised countries often continue to export pesticides which have been *banned or severely restricted in their own countries*, to poorer parts of the world. For example, an estimated 70% of the gross tonnage of pesticides used in agricultural applications in India consists of formulations which are banned or severely restricted in Northern countries.

Developing countries, and many countries with economies in transition, often lack the regulatory and enforcement infrastructure and resources for the sound management of pesticides. It will be impossible to reduce poisonings and contamination unless many highly toxic materials and formulations are eliminated from world trade, and less hazardous substitute pesticides used and/or alternative methods of pest control introduced.

Some pesticide control problems faced by developing countries

1. Lack of facilities for disposal of waste pesticides (66% of all responding developing countries)
2. Export difficulties caused by pesticide residues in food (65%)
3. Pesticides available through distribution outlets that also deal with food, medicines and other products for internal consumption (65%)
4. Unavailability of an appropriate size range of pesticide packages, suitable for end use (to reduce handling and other hazards) (62%)
5. Pesticide labels sometimes or generally not clear and concise (44%)
6. No regulations in force to restrict the availability of pesticides (43%)
7. Lack of a national pesticide registration and control scheme (20%)
8. The government and responsible authorities are not in a position to effectively enforce prohibition of importation, sale and purchase of an

extremely toxic product in their territory (19%)

Source: FAO. 1996. Analysis of Government Responses to the Second Questionnaire on the State of Implementation of the International Code of Conduct on the Distribution and Use of Pesticides.

High risks for agricultural workers and their families

Agricultural workers and small farmers use or are exposed to toxic pesticides from a variety of sources including the crops they grow, harvest and store, the soil they cultivate, from spray drift, and the livestock, poultry and fish they handle. Pesticide applicators have the highest exposures but other workers and farmers are contaminated from spray drift, by working in or walking through treated areas, and handling sprayed vegetation and produce.

Lack of information on hazards and the absence of workplace risk prevention and control measures means that personal protective equipment (PPE) is often the first line of defence for workers and farmers. In reality it should be the last resort and only to supplement other control measures already in place. Furthermore, the PPE is often unsuitable for use in tropical conditions, is often poorly maintained, or changed too infrequently, and often stored in the same area as personal clothing. These factors combined with poor hygiene conditions, such as lack of water in the field to treat skin and eye contamination, result in high levels of fatalities and poisonings.

Women workers are especially vulnerable to suffer ill health from pesticides because of the agricultural context in which they work. They are often/usually part-time or seasonal workers, and do not receive the same levels of information, training and protection as full-time workers. They work in areas treated with pesticides, including commercial glasshouses, or handle plants or harvested crops treated with pesticide. Many of them along with their families live where they work and use pesticide-contaminated water for drinking, bathing and washing, and eat pesticide-contaminated farm food. Furthermore, many small farmers are women. The impact of HIV/AIDS in many parts of the world means that women-headed households - sometimes even child-headed households - are more and more the norm.

Children are a vulnerable group to suffer ill health from exposure to pesticides either because they live on farms or plantations as part of a family; or work as cheap and exploited agricultural child labourers.

Deteriorating labour standards and working conditions, often resulting from the negative aspects of globalisation of trade are eroding the already low levels of protection for agricultural workers in terms of wage levels, employment security and health and safety standards. The worldwide trend towards work flexibility and the pressure to reduce labour and production costs is leading to an increase in daily and seasonal contracts. Hiring of labour through agricultural contractors or 'gangmasters' is increasing, and often results in more precarious employment, lower wages, poorer working conditions and reduced levels of health and safety.

Pesticides, wildlife and the environment

Pesticides can also harm wildlife and contaminate the environment (soil, air and water quality). The wildlife affected by pesticides includes plants and trees; vertebrate species (with a skeleton) such as fish, reptiles, birds, and mammals; and invertebrate species, ranging from insects and their close relatives (arthropods), soil and aquatic organisms, to micro-organisms such as fungi, bacteria and viruses.

The effects of pesticides on wildlife are closely bound up with the type of agriculture practised. The spread and intensification of agriculture, involving increased use of pesticides and artificial fertilisers, has had major negative impacts on the abundance and diversity of wildlife species and the quality of the environment.

Illegal use of pesticides as poison baits are directly responsible for deaths of many fish, wild birds, mammals, farm livestock, pets, and honeybees. Poison is laid in carcasses and in eggs. Pesticides are also widely used as fishing baits.

Are pesticides necessary?

The pesticide industry

The pesticide industry, supported by some governments and intergovernmental agencies, argue that the use of “crop protection chemicals” - the industry name for pesticides - is vital to ensure that food and commodity production is maximised by helping prevent losses during growth, harvest, transport, distribution and storage. And that the quality of food and commodities is maintained and improved at an economic price.

The need to achieve world food security and to eliminate poverty and malnutrition is a major international issue. Governments and other stakeholders at the World Food Summit (WFS) 1996 agreed the Rome Declaration and a Plan of Action with the aim of reducing by 50% the number of hungry persons in the world by 2015. To achieve this target, the United Nations Food and Agriculture Organisation (FAO) argues that major increases in world food production, involving the use of chemical pesticides and artificial fertilisers are needed to feed the world's growing population.

International Union of Food, Agricultural, Hotel, Restaurant, Catering, Tobacco and Allied Workers' Associations (IUF)

Many trade unions, including the IUF and non-governmental organisations (NGOs) disagree with the analysis of the pesticide industry. IUF argues that currently enough food is produced globally to feed the world but that poverty and malnutrition exist because many poor people – an estimated 800 million globally - do not have the money to buy it, and/or access to land to produce it. There is also large over-production of cereals and other foodstuffs in North America and the European Union (EU) countries. This can result in 'food mountains', which are then exported with subsidies, resulting in dumping at artificially low prices in other countries, ruining their local agricultural markets and economies.

The IUF believes that pesticide use should only be justified where there are ***no alternative methods of pest control available*** and where the benefits outweigh the costs of using these hazardous chemicals.

Precautionary and substitution principles

In case of scientific doubt and uncertainty, it is important to apply the precautionary principle. This principle, as enshrined in Principle 15 of the Rio Declaration on Environment and Development (adopted at the UN Conference on Environment and Development 1992) states, "In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation".

The substitution principle - replacing hazardous products by less hazardous equivalents - can also be emphasised to support changes in pesticide product registration. Using this principle can reduce both the number of active ingredients and formulated pesticide products on the market.

ACTIVITY The use of pesticides in your workplace

AIMS

To help us to:

- identify the pesticides used in your workplace
- identify what they are used for and how they are classified
- find out who manufactures pesticides

TASK

In your small group:

1. Discuss and list what pesticides are used in your workplace and who manufactures them
2. Identify where the pesticides are used and what for

Elect a spokesperson to report back

Who makes and sells pesticides?

Pesticides are big business and the industry is dominated by 10 transnational manufacturing companies in the United States of America, Europe and Japan who control 84 per cent of all pesticide sales worldwide. Global pesticide sales were valued at nearly \$30,000 million (US dollars) in 2000.

Manufacturer's top ten

The following chart shows Company name followed by pesticide sales in 2000, in US\$ millions; followed by percent share of world market:

1. Syngenta (Novartis + AstraZeneca): pro forma, \$6,100; **20%**
2. Pharmacia (Monsanto): \$4,100; **14%**
3. Aventis (AgrEvo + Rhone Poulenc): \$3,400; **11%**
4. BASF (+ Cyanamid): pro forma, \$3,400; **11%**
5. DuPont: \$2,500; **8%**
6. Bayer: \$2,100; **7%**
7. Dow AgroSciences: \$2,100; **7%**

8. Makhteshim-Agan: \$675; **2%**

9. Sumitomo: \$625; **2%**

10. FMC: \$575; **2%**

(Source: ETC Group, based on data provided by Allan Woodburn Associates cited in Agrow magazine).

Other countries such as, India, China, Brazil, Russia and other ex-Soviet bloc nations are important pesticide producers with national companies generally producing off-patent pesticides, including for the export market. Their production often includes pesticides banned or severely restricted in other parts of the world.

ACTIVITY Pesticides quiz

AIMS

To help us to:

- use some of the terms associated with pesticides
- have some fun

TASK

You will be divided into pairs. In your pair, look at the multiple-choice quiz and the statements/words/terms relating to pesticides. Use the preceding pages to help you with anything you are not familiar with. Tick the boxes that you feel are the most appropriate.

When you have finished, the whole group will discuss their answers together. You can count up your scores for a bit of fun!

MULTIPLE CHOICE QUIZ - PESTICIDES

Tick one box per question

1. The vast majority of pesticides used today are:
 - biopesticides
 - pesticides based on genetically modified natural micro-organisms (GMOs)
 - synthetic, manufactured chemicals
2. The suffix "icide" (as in pesticide) means:
 - crop protection
 - killer
 - harmless if used properly
3. The World Health Organisation estimates that each year as a minimum:
 - 40,000 people die from pesticides and a further 3-4 million are severely poisoned
 - 2,000 people die from pesticides and a further 1 million are severely poisoned
 - 20,000 people die from pesticides and a further 2 million are severely poisoned
4. Developing countries use:
 - 20% of pesticides and have 30% of the world's fatalities and poisonings from pesticides
 - 20% of pesticides and have 80% of the world's fatalities and poisonings from pesticides
 - 70% of pesticides and have 70% of the world's fatalities and poisonings from pesticides
5. One of the main reasons why the number of fatalities and poisonings from pesticides is so high in developing countries is because:
 - some industrialised countries often continuing to produce banned or severely restricted pesticides solely for export to poorer parts of the world
 - of the climatic conditions
 - of their greater use of pesticides
6. The IUF believes that pesticide use should only be justified where:
 - there are no alternative methods of pest control available and where the benefits outweigh the costs of using these hazardous chemicals
 - the World Trade Organisation says it is important for chemical manufacturers
 - poverty and malnutrition exists
7. A vector is:
 - a new form of pesticide
 - a group of chemical companies which manufactures pesticides
 - a carrier in the transmission of disease
8. Diseases capable of being transferred from animals to humans are collectively referred to as:
 - arthropods
 - zoonoses
 - respiratory diseases
9. 10 transnational companies control:
 - 51% of all pesticide sales worldwide
 - 84% of all pesticide sales worldwide
 - 95% of all pesticide sales worldwide