

Alternatives to highly hazardous pesticides: action that can be taken to eliminate or significantly reduce the risks to health and the environment that result from the use of highly hazardous pesticides¹

Why act on highly hazardous pesticides?

All pesticides are designed to harm living things such as weeds, unwanted insects, fungal infections and rodents and most pesticides will also harm non-target organisms to some degree.

Pesticides that have been found to be most harmful to human health, biodiversity and the environment have been designated as highly hazardous pesticides (HHPs). Guidance from the Food and Agriculture Organization of the United Nations (FAO) and the World Health Organization (WHO) sets out eight criteria that define HHPs:²

1. **Acute toxicity.** Pesticide formulations that meet the criteria of classes Ia or Ib of the *WHO Recommended Classification of Pesticides by Hazard and Guidelines to Classification: 2019*;³
2. **Carcinogenicity.** Pesticide active ingredients and their formulations that meet the criteria of carcinogenicity categories 1A and 1B of the Globally Harmonized System of Classification and Labelling of Chemicals (GHS);⁴
3. **Mutagenicity.** Pesticide active ingredients and their formulations that meet the criteria of mutagenicity categories 1A and 1B of GHS;
4. **Reproductive toxicity.** Pesticide active ingredients and their formulations that meet the criteria of reproductive toxicity categories 1A and 1B of GHS;
5. **Persistent organic pollutants.** Pesticide active ingredients listed by the Stockholm Convention on Persistent Organic Pollutants in its Annexes A and B, and those meeting all the criteria in paragraph 1 of Annex D to the Convention;
6. **Particularly hazardous.** Pesticide active ingredients and formulations listed by the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade in its Annex III;
7. **Ozone depleters.** Pesticides listed under the Montreal Protocol on Substances that Deplete the Ozone Layer;
8. **High incidence of adverse effects.** Pesticide active ingredients and formulations that have shown a high incidence of severe or irreversible adverse effects on human health or the environment.

HHPs make up a relatively small proportion of all pesticides in use but they are disproportionately used in lower- and middle-income countries where the majority of harm from pesticides occurs. Taking action on HHPs has been shown to significantly reduce harm to people and the environment.

Key points for replacing highly hazardous pesticides

Understand the pest/disease problem. Each pest or disease will be associated with specific crops and may vary in different ecosystems and environments. The levels of damage caused, natural predators, environmental controls and even the effectiveness of biocontrols and chemicals may vary in each situation. Identifying the best management options and advising growers requires a good understanding of the crop-pest relationship and their environment. This information comes from farmers, researchers, extension services, plant protection experts, input suppliers, ecologists and others.

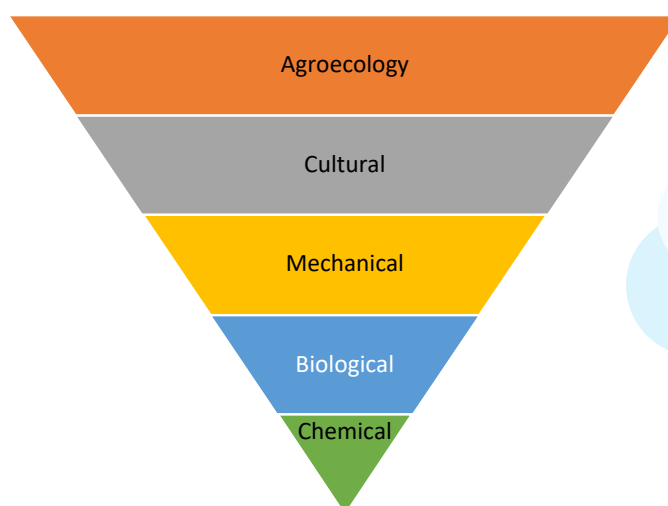
Avoid replacing HHPs with chemicals that cause other problems. Regrettable substitution means replacing one problematic chemical with another that causes different problems. Replacing HHPs creates opportunities to think about different options that cause less harm such as agroecology, mechanical barriers and traps and biopesticides. Regulators in particular should consider options other than chemicals for pest management.

Pest management doesn't necessarily require pesticides. The assumption that pest control depends on chemical pesticides is wrong. There are many other ways of managing pests and diseases that do not require chemicals at all or use chemicals in small amounts to complement other control measures. Farmers and growers should be provided with the most effective, safest, most cost-effective solutions, which may not involve chemicals at all. Regulators, crop protection advisors and the private sector should collaborate to ensure that the best solutions are made available to farmers.

Risk assessment for alternatives. All pest management tools should be subject to risk assessment under regulations that specify how pesticides and other controls are evaluated. Some botanical pesticides can be extremely toxic and some biopesticides can be very benign. Nevertheless, an objective risk assessment can provide reassurance that replacing an HHP will not generate further harm to human health or the environment.

Fast action saves lives and protects the environment. Sometimes the best and safest alternative pest control option is not immediately available, has not been fully evaluated or needs further research and development for a specific crop, pest or agroecological situation. Rather than continuing the use of an HHP, a less hazardous option could be used temporarily until the best solution becomes available. Such action can allow rapid risk reduction action to be taken, on the understanding that further and even better action can be taken at a later date.

Include stakeholders. Including relevant stakeholders in deciding which are the best options for replacing HHPs helps the process better succeed. Stakeholders include regulators, farmers and farmer associations, producers, importers and vendors of agricultural inputs, extension services and other agricultural advisors, research bodies and academia, health authorities, environment authorities and consumers. In several instances, making decisions to remove an HHP without prior consultation has led to problems such as illegal use.



Agroecology works with interactions between plants, animals, humans and the environment within agricultural systems to support sustainable production.

Cultural pest control can include selecting crop varieties suited to the environment and resistant to pests and diseases, using planting and harvest times, distances between crop plants, soil, nutrition and irrigation management and other techniques to keep pests and diseases from damaging crops.

Mechanical pest control can include traps, including lure and kill traps using pheromones to attract pests and small amounts of pesticides to kill them. Barriers can also be used, such as fine netting to prevent insects landing on crops and high plants to prevent flying insects from entering fields.

Biological pest control can include macroorganisms (large organisms) like birds, reptiles and amphibians and predatory and parasitic insects. Biocontrol can also include microorganisms, including bacteria and fungi, that can control pests and diseases and, in some cases, also enhance plant nutrition and growth. Biocontrol can also include behavioural disruptants such as pheromones and in some jurisdictions can also include botanical extracts that act as pest control agents, such as neem and pyrethrum.

Chemical control generally includes synthetic chemicals and should ideally be used to complement other forms of control without undermining or disrupting them. Bringing pests to the chemicals, for example by using pheromones, or targeting chemicals directly at pests, for example by precision-spraying weeds, can significantly reduce the volumes of chemicals used and prevent negative effects on non-target organisms.

Replacements for highly hazardous pesticides should have the following characteristics

Ease of use. Pesticides are not easy to use and often require specialist equipment. Replacements for HHPs should be easier to use than HHPs and farmers should have ready access to advice and information about them.

Wide-ranging and consistent availability. If alternatives are ecosystem services, farmers should be advised to care for them and ensure that they are always present. If they are products, the private sector must be on board to ensure that the alternatives are available to farmers when they are needed.

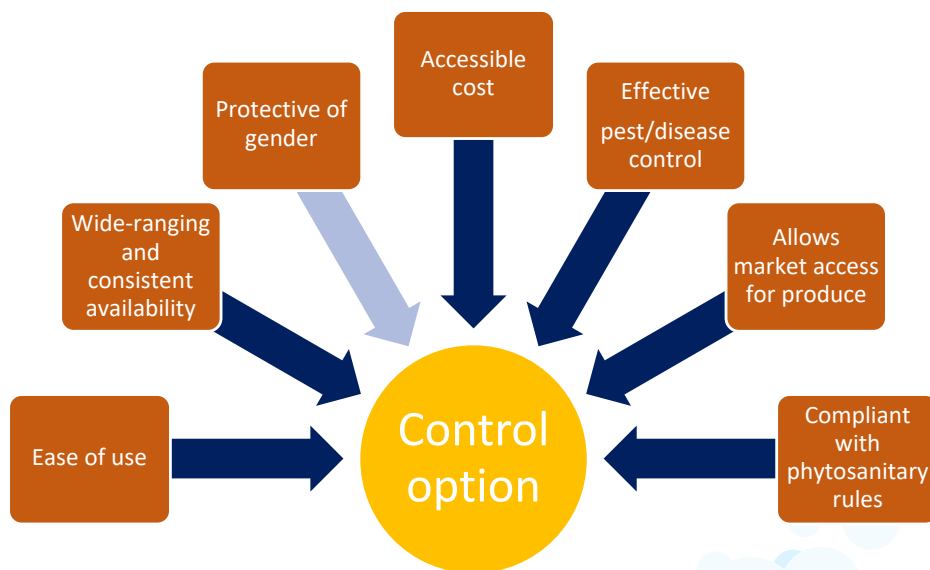
Protective of gender. Women and children are particularly vulnerable to the toxic effects of pesticides, so alternatives must protect them better.

Accessible cost. Some alternatives may be more expensive initially but will pay for themselves over time. The economics of alternatives need to be understood and explained to farmers.

Effective pest and disease control. Of course, alternatives to HHPs must be effective at keeping pests and diseases below levels that would cause economically damaging losses. However, the presence of pests and diseases at low levels rarely causes significant damage.

Allows market access for produce. Trade can be blocked when standards set by importing countries, food processors and retailers are not met with regard to pesticide residues in food crops. Alternatives to HHPs should not compromise food safety or jeopardize trade nationally or internationally.

Compliant with phytosanitary measures. Exports of agricultural produce must comply with phytosanitary standards determined by the International Plant Protection Convention. This does not necessarily require pesticides to be used, but whatever measures are used should ensure that pests and diseases are not spread internationally.



Who makes decisions on highly hazardous pesticides?

Regulators make decisions on which pesticides should and should not be permitted for use in their countries. Regulators can also help to ensure that the most effective and sustainable pest management solutions are registered and made available to farmers and other users of pest control tools.

Farmers, farmer associations and other users of pest control tools. Farmers are knowledgeable and experienced with regard to pest management and crop production. Their agreement is essential to the success of replacing HHPs with other tools. They should be included in decision-making processes.

Vendors, importers, producers and registrants. Removing HHPs from use may harm producers, importers and vendors of these products, but they can also benefit from making alternatives available. Including them in decision-making processes is beneficial to effectively replacing HHPs.

Extension services and other advisors. Public and private sector advisors need to be included in HHP replacement processes so that they are aware of the need to propose alternatives and are informed about what alternatives are available.

Researchers and academia help to identify alternatives to HHPs as well as researching the effectiveness of alternatives and the impacts of HHPs on human health and the environment.

Health authorities have information on and experience in dealing with pesticide poisonings, suicides and chronic effects. Their inclusion in decision-making processes can ensure that current problems are resolved and future problems are avoided.

Environment authorities have information on the environmental impacts of pesticides on biodiversity, water, air and soil. As for health authorities, their involvement can help to resolve existing problems and prevent future problems.

Consumers. Consumer demand for safe food has been a major driver in changing farming practices and can be used to support and accelerate policies aimed at reducing HHP uses and risks.

Media. Media attention on the health and environmental impacts of HHPs and the promotion and effectiveness of alternatives can be important catalysts in the HHP replacement process.

Public interest groups play important roles in receiving information from and disseminating information to communities that use and are affected by HHPs.

Resources

The *International Code of Conduct on Pesticide Management*⁵ provides a comprehensive framework for life cycle management of pesticides. *Guidelines* that elaborate on various articles of the Code are developed and published online. *The Guidelines on Highly Hazardous Pesticides*⁶ are particularly helpful in the context of the present document.

The *Pesticide Registration Toolkit*⁷ is a comprehensive web-based system designed to help pesticide regulators gather and interpret all the information required to make informed decisions on pesticides. It includes a section on information sources with links to many useful sites. A *special topic within the Toolkit addresses HHPs* and provides links to further helpful guidance and resources.

The 2019 edition of *The WHO Recommended Classification of Pesticides by Hazard and Guidelines to Classification* is the document that defines criterion 1 of the HHP criteria. It is a useful reference to determine the acute toxicity of all pesticides.

"*The Potential key role of Strategic Approach to International Chemicals Management (SAICM) national focal points in reducing harm from highly hazardous pesticides*"⁸ and other SAICM resources on HHPs.

*Synthesis Report on Environmental and Health Impacts of Pesticides and Fertilizers and Ways of Minimizing Them.*⁹

The community of practice of SAICM and the University of Cape Town, South Africa, on highly hazardous pesticides.

Endnotes

- 1 United Nations Environment Programme (2023). *Guidelines on Alternatives to Highly Hazardous Pesticides* (Geneva). Available at <https://www.unep.org/explore-topics/chemicals-waste/what-we-do/emerging-issues/highly-hazardous-pesticides-hhps>.
- 2 Food and Agriculture Organization of the United Nations and World Health Organization (2016). *Guidelines on Highly Hazardous Pesticides* (Rome). Available at <https://www.fao.org/3/i5566e/i5566e.pdf>.
- 3 World Health Organization (2020). *The WHO Recommended Classification of Pesticides by Hazard and Guidelines to Classification: 2019* (Geneva). Available at www.who.int/publications/i/item/9789240005662.
- 4 ST/SG/AC.10/30/Rev.9.
- 5 Food and Agriculture Organization of the United Nations and World Health Organization (2014). *International Code of Conduct on Pesticide Management* (Rome). Available at <https://www.fao.org/3/i3604e/i3604e.pdf>.
- 6 Food and Agriculture Organization of the United Nations and World Health Organization (2016). *Guidelines on Highly Hazardous Pesticides* (Rome). Available at www.fao.org/3/i5566e/i5566e.pdf.
- 7 Food and Agriculture Organization of the United Nations (2019). *Pesticide Registration Toolkit* (Geneva, 2019). Available at www.fao.org/pesticide-registration-toolkit/en/.
- 8 *Strategic Approach to International Chemicals Management (2022). The potential key role of SAICM national focal points in reducing harm from highly hazardous pesticides.* Available at <https://www.fao.org/3/cc1806en/cc1806en.pdf>.
- 9 *United Nations Environment Programme (2022). Synthesis Report on the Environmental and Health Impacts of Pesticides and Fertilizers and Ways to Minimize Them* (Geneva). Available at www.unep.org/resources/report/environmental-and-health-impacts-pesticides-and-fertilizers-and-ways-minimizing.