

Pesticide Discussion Forum Summary Digest

Personal Protective Equipment (PPE) when handling and applying pesticides

Pesticides are used in a variety of settings in low- and middle-income countries (LMICs), primarily in agriculture for crop protection from pests and in the public health sector. The range of chemicals are typically highly toxic and require the use of personal protective equipment (PPE) that is often burdensome, costly and inadequate. The use of PPE involves regulators' and users' understanding the health risks from exposures to pesticides. In addition, sufficient resources are required not only for the equipment itself and access to it, but also for the training and education necessary for workers to fully understand the requirements, proper selection, use and care of such equipment. Various laws and regulations may mandate the use of PPE, but a major gap exists between requirements and implementation. This discussion focused on these issues and introduced the new *FAO/WHO Guidelines on Personal Protection when Handling and Applying Pesticides*.

About the Presenters



Beatrice Grenier works with FAO on various pesticide management issues. She is involved in normative activities related to the FAO/WHO International Code of Conduct on Pesticide Management and in field projects in particular in West Africa.



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DISCLAIMER: The information below represents the opinions of members participating from different countries expressed during the discussion and shall not necessarily be taken to reflect the official opinion of the DEH, UCT, FAO, SIDA or Kemi.

The discussion was structured around three questions and the key discussion points are presented under each:

Question 1: What are the 3-4 main routes of exposure to pesticides into the human body when handling and applying pesticides most problematic in your country or the country you work in? What pesticide handling/use phases are most problematic? What can be done to reduce exposure (not considering PPE yet)?

INDIA: Many deaths in India are due to inhalational and contact exposure to pesticides while spraying. Most problematic exposures occur during mixing, loading, spraying and washing equipment. It is better to not to use pesticides.

UGANDA: Problematic exposures are by dermal contact and inhalation of the pesticide fumes. To reduce exposure, use of non-chemical pest control and only using pesticides when it is necessary. Also, sticking to the directions of use of the product provided on the product label.

ZIMBABWE: Dermal, inhalation, oral and through the eyes (ocular) are the main routes of exposure. Mixing, handling and application are the most problematic exposure periods. Use of non-chemically based methods are encouraged.

ZAMBIA: The main routes of exposure include dermal, inhalation and oral. To reduce the risk of exposure, there is a need to conduct sensitization/awareness on the risks associated to pesticide handling and how to read the pesticide label to know what PPE is required.

SOUTH AFRICA: Dermal exposure for farmers and pesticide applicators are the most problematic as they prepare mixtures,

load the pesticides into sprayers and spray diluted pesticides on the fields. Implementation of IVM and IPM strategies; environmental management; use of non-chemical pesticides and pheromones primarily is needed.

MALAWI: Main routes of exposure occur when handling and applying pesticides through the mouth, skin, nostrils and eyes. Problematic exposures occur during pesticide handling and use during preparation, mixing, loading and application.

ESWATINI: Inhalation, skin contact, and ingestion are the main routes of exposure. By-standers are most affected from spray drifts. The most problematic period is during mixing and application. To reduce exposure, the minimization of chemical control for pests through implementation of IPM, training of applicators and other stakeholders on the risks associated with pesticides are needed.

TOGO: The most problematic exposure periods are during handling and application. The farmers are not aware of good agriculture practices in applying pesticides. This leads to high pesticide residues in foodstuffs and high exposures in farmer's population and bystanders.

Question 2: What are the specific problems in your country regarding PPE use / incorrect use / non-use? What should be done to improve this situation?

UGANDA: i). After application with a knapsack sprayer, the sprayers wash the knapsack with their bare hands, thus exposing themselves to chemicals. ii) PPE is not affordable to most smallholder farmers. iii) PPE is not always available in most rural areas and where available the hot tropical conditions hinder the sprayers from wearing them.

SOUTH AFRICA: i) The language of PPE instructions on labels is not always ii) The use of herbicides is not perceived as a major health concern in comparison to insecticides or fungicides. iii) There is a lack of training on the importance and proper use of PPE. iv) PPE cost is high and in some places is not readily available. iii) Sensitizing and training key stakeholders on the importance and the proper use of PPE. v) Avoid application and spraying activities during hot temperatures.

ZIMBABWE: i) Some farmers ignore specific PPE requirements. ii) Farmers may choose not to always use full PPE due to hot conditions. iii) Commercial farmers can increase compliance on the use of full PPE through increased frequency of supervision. The best option for small-scale farmers is to use other methods of pest control that do not require complex PPE.

ZAMBIA: i) Most PPE use problems include lack of training resulting in incorrect use ii) the cost PPE is usually high and only a few can afford to buy. iii) and PPE sometimes is tedious due to its weight and also high temperatures. iv) Needed is PPE awareness and sensitization.

BELIZE: i) Regulators should scrutinize formulation of pesticide to see whether it matches its use type and that the label includes all the PPE requirements. ii) The problem in Belize is the non-use of PPE due to its cost, its accessibility and "discomfort". iii) Some farmers in the tropics do not always want to wear PPE. iii) Sometimes the knapsack sprayer has a tiny hole and some of the formulation spills on their back in which case they are only wear a cotton shirt to "protect" them.

INDIA: i) Regulators should implement the Article 3.6 of the Code, which states "*Pesticides whose handling and application require the use of personal protective equipment that is uncomfortable, expensive or not readily available should be avoided, especially in the case of small-scale users and farm workers in hot climates*". ii) Key stakeholders need to be sensitized of the importance and the proper use of PPE. iii) Phase-out pesticides while encouraging farming communities to use non-chemical alternatives.

ESWATINI: i) Lack of knowledge of the risks as well as costs of purchasing the PPE. ii) Affordability of the PPE is an issue. iii) The hot climate discourages wearing PPE. iv) The low awareness levels on the health impacts of pesticides contribute towards workers not wearing PPE. v) Training for all farmers must be up scaled.

TANZANIA: i) Accessibility of PPE, affordability of buying PPE, negligence among the farmers and pesticide applicators due to hot weather conditions, and inadequate knowledge about pesticide risks and the proper wearing of PPE are issues. ii) Training of stakeholders is needed about when to apply, pesticide risks, importance of using recommended PPE, and proper wearing of PPE – including developing guidelines for proper PPE use in English and local languages.

NIGERIA: i) Sensitizing and training key stakeholders on the importance and the proper use of PPE is needed. ii) Application and spraying activities should be carried out early or late during the day to avoid the hottest times.

Question 3: What factors related to exposure and risk mitigation measures should regulators take into account when registering pesticides? What improvement needs to be done in relation to PPE in the regulatory context at registration and enforcement steps?

The International Code of Conduct on Pesticide Management: provides several guidelines for minimising and reducing pesticide exposures to people and environmental contamination. Regulators need to comply with these.

Scrutinize that the formulation of pesticide matches its use type: That the label has all the PPE clothing one needs to use with a particular pesticide product. In the event HHPs are registered, they should be severely restricted to specific users only.

Implement the Article 3.6 of the Code: refer to original text above.

Ecotoxicity data of the pesticide to non-target organisms and the type of region where the pesticide would be applied: The improvement needs to be done in relation to PPE in the regulatory context are: i.) Clear and simple label instructions; ii.) Affordable and weather friendly PPE; and iii.) Enforcement and compliances with the use of PPE.

Availability and affordability: Pesticide regulators should make considerations on whether the stated PPE on the label is available and affordable to general farmers. Furthermore, registering pesticides that do not require complex PPE for small scale farmers.

Spot checks: It is desirable for agricultural extension officers to carry out random spot checks on the correct use of PPE. Commercial farmers should be encouraged to provide spot checks at their farms.

Stop one size fits all approach: Often times the PPE comes in one size for all users but one size does not fit all pesticide users.

PRESENTER NOTES: Not all pesticides should have similar access (e.g., the HHP aluminium phosphide is cheap and readily available in many LMICs). Regulations should control this. If feasible, a law should state that all pesticide retail outlets should stock required PPE.

Resources and Further Reading

1. [Guidelines for personal protection when handling and applying pesticides](#), FAO/WHO, 2020
2. [Guidance on Pest and Pesticide Management Policy Development](#), FAO, 2010
3. [Hierarchy of controls](#) [YouTube video]
4. [Pesticide use and your personal protective equipment \(PPE\)](#) (Oregon USA)
5. [Agricultural pesticide personal protective equipment](#) (Colorado USA)
6. [Women and PPE: finding the right fit](#)
7. [Letter to the editor: use of personal protective equipment in agricultural workers under hot and humid conditions](#)
8. [Preventing heat stress in agriculture](#) (US EPA)
9. [Occupational heat exposure](#) (US OSHA)
10. [Pesticide risk perceptions, knowledge, and attitudes of operators, workers and residents: a review of the literature](#)
11. [Chemical exposure reduction: Factors impacting on South African herbicide sprayers' personal protective equipment compliance and high risk work practices](#)
12. [Pesticide Knowledge and Safety Practices among Farm Workers in Kuwait: Results of a Survey](#)
13. [Guidelines on HHPs](#), FAO/WHO, 2016
14. [Critical review of the role of PPE in the prevention of risks related to agricultural pesticide use](#)
15. [Factors affecting use of personal protective equipment and pesticide safety practices: A systematic review](#)
16. [Guidance on the Assessment of Exposure for Operators, Workers, Residents and Bystanders in Risk Assessment for Plant Protection Products](#) (EFSA)

The Division of Environmental Health (DEH) Pesticide Discussion Forum is a bi-monthly online seminar for pesticide regulators and resource persons, as well as students in the Post-Graduate Diploma in Pesticide Risk Management (DPRM). Our aim is to provide support for managing pesticide risks and implementing risk reduction strategies. DEH is based in the School of Public Health and Family Medicine at the University of Cape Town (UCT). **This Digest was produced by: Tatum Louw** | Forum Administrator | lwxtat001@myuct.ac.za. **Prof Andrea Rother** | Forum Moderator | andrea.rother@uct.ac.za **Acknowledgement:** Financial assistance from the Swedish International Development Cooperation Agency (SIDA), has been arranged by the Swedish Chemicals Agency (KemI)

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