



vegIMPACT Report 11
March 2015

vegIMPACT

Training Manual

Occupational Pesticide Exposure & Health

*Edwin van der Maden, Femke Gordijn, Melliza Wulansari,
Irene Koomen*



vegIMPACT

Improved Vegetable Production and Marketing for small farmers to Increase the Food Security status and to promote Private Sector Development in Indonesia



vegIMPACT is a program financed by The Netherlands' Government promoting improved vegetable production and marketing for small farmers in Indonesia, contributing to the food security status and private sector development in Indonesia. The program builds on the results of previous joint Indonesian-Dutch horticultural development cooperation projects and aligns with recent developments in the horticultural private sector and retail in Indonesia. The program activities (2012 – 2016) include the Development of Product Market Combinations, Strengthening the Potato Sector, Development of permanent Vegetable Production Systems, Knowledge Transfer and Occupational Health.

Wageningen University and Research centre (Wageningen UR, The Netherlands):

- *Applied Plant Research (APR), AGV Research Unit Lelystad*
- *Centre for Development Innovation (CDI), Wageningen*
- *Plant Research International (PRI), Wageningen*
- *Agricultural Economics Institute (LEI), Den Haag*

Contact person:

Huib Hengsdijk, huib.hengsdijk@wur.nl

Indonesian Vegetable Research Institute (IVEGRI, Indonesia)

Contact person:

Witono Adigoya, balitsa@balitsa.org

Fresh Dynamics (Indonesia)

Contact person:

Marcel Stallen, info@freshdynamics.biz

www.vegIMPACT.com

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Training Manual

Occupational Pesticide Exposure & Health

Edwin van der Maden¹, Femke Gordijn¹, Melliza Wulansari², Irene Koomen¹

¹ Centre for Development Innovation, Wageningen UR

² Fresh Dynamics Indonesia



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Maden, E. van der, F. Gordijn, M. Wulansari and I. Koomen 2015. Training Manual Occupational Pesticide Exposure & Health. vegIMPACT Report. 61 pp. + Annexes

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Background

The VegIMPACT project, short for 'vegetable production and marketing with impact', aims to improve vegetable production and marketing of small farmers in Indonesia. VegIMPACT contributes to increased food security and private sector development in Indonesia and is financed by the Netherlands Government. The program (2013-2016) is carried out by Wageningen University and Research Centre, together with local partners and national and international companies involved in the vegetable production and marketing chain.

One of the work packages of the vegIMPACT project is Occupational Health. This work package intends to reduce pesticide related occupational health hazards, with specific attention to women.

In Indonesia, pesticide use is one of the most important occupational health risks for agricultural workers. Pesticides are used extensively based on the idea that preventive spraying is necessary to protect the crop and obtain good yields. In addition pesticides are often handled and applied injudiciously, i.e. too high dosage, improper chemical used for the specific pest or crop, unsuitable and unsafe application practices. Farmers often do not use effective Personal Protective Equipment (PPE) and labourers, who are often women, are at times present in the field during spray activities. As a result farmers, labourers, and rural communities are jeopardized by the high dependence on pesticides for vegetable production and the daily unsafe exposure to these chemicals, potentially leading to undesired exposure and health impact.

At the moment there is limited awareness about the chronic negative health effects of exposure to pesticides such as e.g. cancer, infertility and miscarriages. Especially women receive no or limited information on pesticides. In order to reduce pesticide related occupational health risks in Indonesian agriculture major steps must be taken with regard to the reduction of pesticide exposure and improvement of handling and application practices.

This training manual is developed as a supplement to the vegIMPACT 'Occupational Pesticide Exposure & Health' PowerPoint presentation and is designed for trainers facilitating the vegIMPACT 'Occupational Pesticide Exposure & Health' training.

1 Notes to the Trainer using this Manual

Purpose

This training manual is aimed at trainers of the vegIMPACT 'Occupational Pesticide Exposure & Health' training and is designed to guide the trainer in the facilitation process of providing the training to (a variety of) participants (e.g. farmers, field labourers, health and agricultural extension officers).

This training manual is a supplement to the vegIMPACT 'Occupational Pesticide Exposure & Health' PowerPoint presentation, of which the PowerPoint slides are shown in this manual.

Design

This manual consists of two sections:

1. Training Modules

In this section the Occupational Pesticide Exposure & Health training modules are explained with reference to the accompanying PowerPoint slides. The information presented in the PowerPoint slides is explained, additional information is provided for clarification, and illustrations and techniques are given to help you to inform the participants on the risk of occupational pesticide exposure and to train them on how to protect themselves, their family and the environment from the risks of being exposed to pesticides. The training consists of the following modules:

- Module 1: Pesticide Basics
- Module 2: Pesticides & Exposure
- Module 3: Pesticides & Health + First Aid Acute Pesticide Poisoning
- Module 4: Pesticide Labels
- Module 5: Safe Pesticide Handling
- Module 6: Pesticides & Hygiene
- Module 7: Disposal of Pesticides Waste
- Module 8: Storage of Pesticides

At the beginning of each module the specific learning objectives are given.

2. Adult Learning and Participatory Training

This section provides the trainer with the theory and methods of adult learning and participatory training in order for the trainer to:

- Improve understanding of learning principles and adult education;
- See the importance of an interactive training approach attuned to the participants;

- Understand the experiential learning cycle and different learning styles;
- Enable them to use different interactive learning methods;
- Improve micro skills in facilitation;
- Provide a training with impact.

Suggestions for using the training manual

- The PowerPoint presentation 'Occupational Pesticide Exposure & Health', accompanying this training manual, serves as a (general) basis for the training and can be adapted to the needs of the participants and the experience of the trainer.
- The modules are designed to provide flexibility in planning and conducting the training as the modules can be used independently from each other.
- The modules and the training in general can be lengthened or shortened depending on the level of knowledge and expertise of the participants.
- Several of the questions in the PowerPoint could also be replaced by short buzz exercises (short discussion with a neighbour about the question) or, if time permits, be replaced by interactive assignments. Some suggestions for interactive assignments are provided in grey suggestion boxes.
- At the end of each section a list of additional resources is given, which provides you with additional background information and information that can help you to prepare for delivering the training modules.
- Whichever changes or adaptations the trainer decides to make to the training modules and materials, please keep the focus on the mission: to train participants on why and how to protect themselves, their family and the environment from risks of being exposed to pesticides.

A few points to take into account

- Talking about pesticides involves a discussion about current practices and habits. It might be difficult for participants to discuss the topic as they may feel bad when they realize some of their practices may be harmful or that they have done things the 'wrong' way. So be sensitive about this, try to create a safe learning environment and try to use pluralism and general terms (e.g. 'many people do...' instead of 'you do...').
- It is important to use common terms. For example, not everyone will use the term pesticide. Instead, they might have a different name for it (sometimes 'medicine'). So be sure that the participants and you talk the same language!
- Be aware of gender. It is the aim of this project to also specifically address the female labourers and their health issues so make sure you have a strategy how best to reach them.
- Some of the negative health effects of pesticides affect the reproductive organs. While this is very important for participants to understand, it is also a sensitive topic to talk about, especially in mixed groups. As a facilitator be aware of this and approach this subject with appropriate sensitivity.

How to start?

You can start the training by welcoming everyone, thanking them that they found the time to attend this training, conduct a short 'getting-to-know-each-other' exercise, and ask a few simple questions to break the ice and get acquainted with the group, e.g.:

- *Has anyone attended a training or workshop on pesticides before?*
- *What kind of topics (related to pesticides) do you expect to be discussed today?*
- *What kind of topics (related to pesticides) would you like to talk about today? What are the questions or issues you struggle with?*
- *Is there anything else you feel is relevant to share / say before we start the training?*

More suggestions on how to start a training you can find in Chapter 3 of this manual.

Building trust and commitment

Building trust is very important to successfully deliver the message. Participants should have trust in the trainer in order to believe the information provided and take to heart the advice the trainer is giving them. Some tips to help you build trust are:

- Be on time and prepare the room, creating an inviting atmosphere when participants arrive.
- Dress appropriately.
- Introduce yourself as a person who wants to share and learn, not as a person who knows everything and has only come to teach or inform others.
- Listen carefully to the participants and give them the opportunity to talk. Do not judge.
- Be open and honest about the reason for your visit and how the participants and the entire community will benefit from the training. Share with them why this topic is important to you and any (personal) stories you have about being affected by pesticide poisoning.
- Keep your promises (e.g. stop on time, give people the break you promised them, etc.). If you cannot, explain to the group the reasons.
- Act on facts, not on assumptions (e.g. check their level of knowledge on pesticides, do not assume they do not know).
- Seek positive solutions for adverse circumstances.
- Be self-reflective, learn from experiences. Critically evaluate your own performance as a trainer, or ask for feedback from colleagues and participants.
- Acknowledge when you are wrong, we all make mistakes.
- Use a sense of humour. Humour can make your training more effective as people will enjoy the learning process.
- Be flexible, but keep your focus on the task: to train participants on why and how to protect themselves, their family and the environment from risks of being exposed to pesticides.

2 Occupational Pesticide Exposure Modules

2.1 Introduction

Start the training with explaining the purpose of this training session (**Slide 1**):

“Providing you with information and methods that can help you to protect yourself, your family and the environment from risks of being exposed to pesticides”

After explaining the goal of this training you can ask the participants why they think this is important. Give the participants the opportunity to come up with some reasons or ask some of the participants to give some reasons. After that, some of the reasons you can add are, e.g.:

- Prevention is better than cure.
- Pesticides are dangerous poisons / chemicals; wrong pesticide use can lead to health problems.
- With incorrect knowledge about pesticides you are not only putting yourself at risk, but also people and the environment around you.
- Safe use practices can greatly reduce the risks associated with the use of pesticides.
- Good pesticide practices will reduce production costs and improve product quality!


Next, introduce the program and content of the training to the participants (**Slide 2**). Explain to the participants that this training has an interactive and participatory character and that they are invited to actively participate. During the training they will be asked questions and will be asked to do short assignments or exercises.


Introduction

Goal

Provide you with information and methods that can help you to protect yourself, your family and the environment from risks of being exposed to pesticides

Why do you think this is important?




Introduction

Slide 1

Introduction

Content of this training:

Module 1: Pesticide Basics

Module 2: Pesticides & Exposure

Module 3: Pesticides & Health

First Aid Acute Pesticide Poisoning


Module 4: Pesticide Labels

Module 5: Safe Pesticide Handling

Module 6: Pesticides & Hygiene

Module 7: Disposal of Pesticides Waste

Module 8: Storage of Pesticides


Introduction

Slide 2

2.2 Module 1: Pesticide Basics

Learning Objectives

After this module participants:

- Understand what are pesticides and what they are used for
- Realize that pesticides are poison and can be harmful to humans
- Realize that pesticides are also used at home
- Can name the different types of pesticides and know which ones are most toxic to humans
- Know pesticides come in different forms

Start this module with asking the participants why we use pesticides and what we use them for (**Slide 3**). Make sure you talk about the same thing and therefore also ask the participants what is the (local) word they use for pesticides. Give the participants the opportunity to reply to this question or ask some of the participants to answer the question. Continue with giving the answer to the question by explaining **Slide 4**.

Pesticides are chemicals used to: 1) Kill, repel or control pests to protect crops before and after harvest; 2) Destroy weeds or prevent their growth; 3) Preserve plant products. While pesticides may help control unwanted pests, they can also be harmful to people, animals and the environment. Sometimes it is very hard to see or smell the pesticides. However, just because you cannot see or smell them, it does not mean the chemicals are not still there.


Pesticides are not medicines, but are dangerous chemicals: Pesticides are poison!


Most pesticides are used in agriculture, but they can also be used at home or in the community. Examples are:

- Cockroach sprays
- Mosquito sprays and coils
- Rat poison
- Flea and tick sprays & powders

What are Pesticides?

Why do we use pesticides and what do we use them for?





Module 1 – Pesticide Basics


Slide 3

What are Pesticides?

Pesticides are chemicals used for:

- 1) Kill, repel or control pests to protect crops before and after harvest;
- 2) Destroy weeds or prevent their growth;
- 3) Preserve plant products.

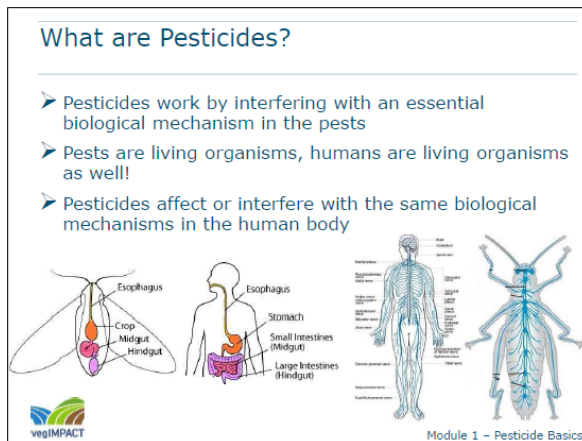
- Pesticides may help control unwanted pests, but can also be harmful to people, animals and the environment!
- Pesticides are poison!
- Most pesticides are used in agriculture, but they can also be used at home or in the community



Module 1 – Pesticide Basics

Slide 4

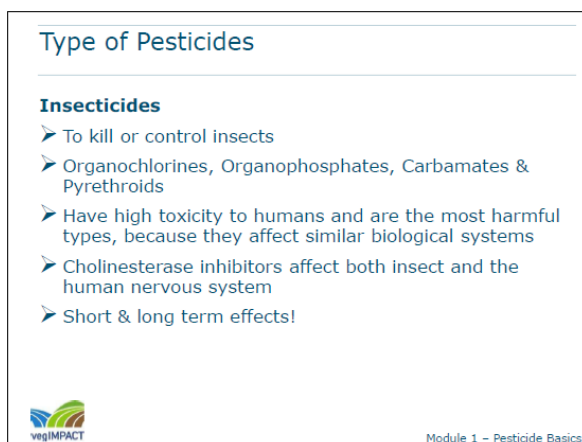
To illustrate that pesticides can also be harmful to humans explain with **Slide 5** that pesticides work by interfering with essential biological mechanisms in the pest, that pests are living organisms, just like humans and thus pesticides can also affect biological processes in the human body. Use the pictures in Slide 5 to emphasize this. These pictures illustrate and show that the digestive system (left) and the nerve system (right) are similar both for insects and humans.



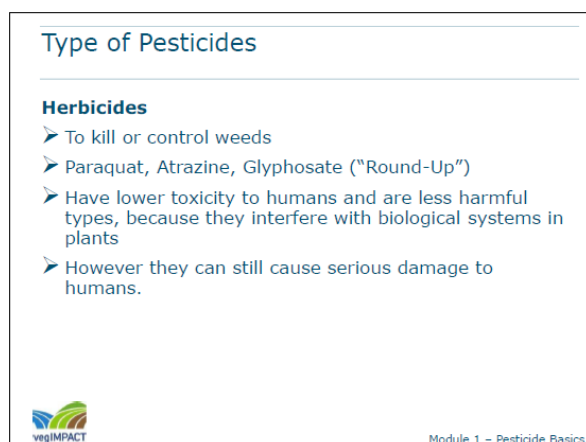
Slide 5

In the next slides explain the main three types of pesticides: 1) Insecticides (**Slide 6**), 2) Herbicides (**Slide 7**), and 3) Fungicides (**Slide 8**). For each pesticide type some examples of (categories of) pesticides are given.

Emphasize with insecticides that these are the most harmful to humans, because they can directly affect biological processes in the human body. Most insecticides are cholinesterase inhibitors, working against undesirable insects by interfering with, or 'inhibiting' cholinesterase. Cholinesterase is one of many important enzymes needed for the proper functioning of the nervous systems of insects, but also of humans, and can thus also be poisonous, or toxic, to humans. Overexposure can result in cholinesterase inhibition (i.e. pesticides combine with acetylcholinesterase at nerve endings in the brain and nervous system, allowing for acetylcholine to build up, while protective levels of the cholinesterase enzyme decrease), which can lead to pesticide poisoning.



Slide 6



Slide 7

Some signs and symptoms of pesticide poisoning from cholinesterase inhibition, depending of the severity of poisoning, are:

- *Mild poisoning*: tiredness, weakness, dizziness, nausea and blurred vision;
- *Moderate poisoning*: headache, sweating, tearing, drooling, vomiting, tunnel vision, and twitching;
- *Severe poisoning*: abdominal cramps, urinating, diarrhoea, muscular tremors, staggering gait, pinpoint pupils, hypotension (abnormally low blood pressure), slow heartbeat, breathing difficulty

However, keep in mind that certain signs or symptoms can also be caused by other factors. 'Module 3: Pesticides & Health' elaborates in more detail on signs and symptoms of pesticide poisoning.


Although insecticides are the most harmful to human, also herbicides and fungicides can be highly harmful to humans, as they indirectly affect human health and are still poisons.

With the next slide, explain that pesticides come in different forms (powders, granules and liquids) and that there are different ways of preparing them before you can apply them to the crop (dissolve in water, dilute with water, or use them directly) (**Slide 9**). The abbreviations in the right column give the pesticide formulation codes used, by which you can identify the pesticide's form. Note here that powders are dangerous during preparing pesticide mixtures, because they can be easily inhaled. With liquids there is the higher danger of spilling and absorption through the skin.

Type of Pesticides

Fungicides


- To control plant diseases, fungi and moulds
- Sulphur, Thiocarbamate
- Have lower toxicity to humans and are less harmful types
- However they can still cause serious damage to humans.


Module 1 – Pesticide Basics

Slide 8

Type of Pesticides

Powder vs. Liquid	<u>Pesticide Formulation Code</u>
➤ Dry – Sprayable	<ul style="list-style-type: none"> ▪ WP – Wettable powders ▪ WG / WDG – Water dispersible granule
➤ Liquid – Sprayable	<ul style="list-style-type: none"> ▪ SL – Soluble Concentrate ▪ SC – Suspension Concentrate ▪ EC – Emulsifiable Concentrate ▪ ME – Microemulsion ▪ OD – Oil Dispersion ▪ CS – Microencapsulated Particles
➤ Dry – Spreadable Granule	<ul style="list-style-type: none"> ▪ GR – Soil applied Granule


Module 1 – Pesticide Basics

Slide 9

Suggestion for interactive assignment (slide 6-8): Pesticide Types

Requisites:

- Coloured paper cards
- Masking tape
- Pictures of pests and diseases
- Flipchart & markers

1. Put three paper cards on the wall with the words: Insecticide, Herbicide, Fungicide.
2. Prepare some pictures of (results of) pest and diseases of vegetables.
3. Each participant is asked to pick one of the pictures, and is asked to stick it under the right category.
4. The facilitator evaluates or summarizes the results of participants. If there are any mismatches mismatch results, ask other participants to review.

Explain to the participants that it is important to be able to recognize which pest or disease is present in your crop, so you can choose the right pesticide type for control.

2.3 Module 2: Pesticides & Exposure

Learning Objectives

After this module participants:



- Can name the three ways pesticides can enter the human body
- Understand that skin absorption is the most common exposure route for pesticides
- Can explain the difference between direct and indirect exposure to pesticides
- Can name what persons can be exposed to pesticides and can explain how they can be exposed
- Know that you do not always realize that you are being exposed to pesticides
- Can explain what determines the extent of exposure to pesticides
- Understand the concepts of dose, time and toxicity

Start this module with asking the participants how they think pesticides enter the human body (**Slide 10**). Give the participants the opportunity to reply to this question or ask some of the participants to answer the question. Continue with giving the answer to the question by using **Slide 11**. Pesticides can enter the body in three ways:

- *Skin absorption*: when the skin gets in contact with a pesticide, it will be absorbed through the pores of the skin and in that way can pass into the bloodstream.
- *Ingestion*: pesticides swallowed accidentally (e.g. if food, cigarettes or hands contaminated with pesticides) enter the stomach, can do damage to the digestive system and can also pass into the blood stream this way.
- *Inhalation*: through breathing of air contaminated (e.g. dust, from powder pesticides when preparing mixtures; or mist, from spraying pesticides) pesticides enter the lungs, can do damage to the respiratory system and can also pass into the blood stream this way.

How can people be exposed to pesticides?

How do pesticides enter the human body?

Module 2 – Pesticides & Exposure

Slide 10

How can people be exposed to pesticides?

How do pesticides enter the human body?




Module 2 – Pesticides & Exposure

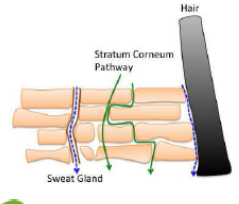
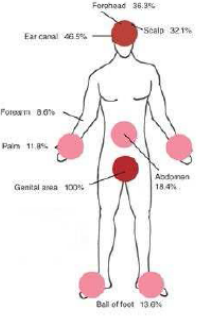

Slide 11

Explain that skin absorption is the most common exposure route of pesticides entering the human body (**Slide 12**). Especially pesticides can easily enter the body through body parts that have thinner skin. These parts are indicated in the body map picture in Slide 12 with red circles. The other picture in Slide 12 shows the three ways how a pesticide can enter the body through the skin:

- Through the sweat gland.
- Through the skin cells.
- Through the hair follicle.

How can people be exposed to pesticides?

➤ Skin absorption is the most common type of exposure!







Module 2 – Pesticides & Exposure


Slide 12

Then ask the participants what persons can be exposed to pesticides and how they can be exposed, and what could be the difference between direct and indirect exposure to pesticides (**Slide 13**). Give the participants the opportunity to reply to the questions or ask some of the participants to answer the question. Alternatively let the participants first buzz in pairs for a few minutes.

How can people be exposed to pesticides?

Who are exposed to pesticides and how? 

What is the difference between direct and indirect exposure to pesticides? 

 Module 2 – Pesticides & Exposure

Slide 13

Suggestion for interactive assignment (Slide 13): Pesticide Exposure

Requisites:

- Coloured paper cards
- Masking tape
- Flipchart & markers

1. Divide the participants in small groups.
2. Ask the participants to draw situations / examples of where and how people can be exposed to pesticides. Additionally you can ask the participants to indicate if the situation / example is direct or indirect exposure.
3. Each group share their findings plenary.
4. Continue with Slides 14, 15 and 16.

Suggestion for interactive assignment (Slide 13): Skin Absorption

Requisites:

- Spray bottle with menthol solution (A)
- Spray bottle with water (B)

1. Invite three volunteers.
2. Ask them to put their hands out.
3. Spray the right hand with bottle A and left hand with bottle B.
4. Ask them if they share what they feel different between the left hand and the right hand.

Explain to the participants that different liquids and solutions also have different absorption rates, e.g. menthol or alcohol is easier to be absorbed by the skin than water. The same counts for pesticides.

Continue with giving the answer to the question by using **Slides 14, 15 and 16**. There are different groups of people who can be exposed to pesticides. Make a clear difference between direct exposure (persons who are aware of the fact that they are being exposed to pesticides) and indirect exposure (persons who might not be aware of the fact that they are being exposed to pesticides):

- *Occupational pesticide users (direct exposure)*: These are persons who directly handle pesticides, e.g. perform tasks in preparation for an application (mix a pesticide with water and load it into the

knapsack) and application of the pesticide (operating a knapsack and spraying the pesticide onto the crop), through which they are directly exposed to pesticides. This also includes persons who work in the field during or shortly after spraying (e.g. female labourers weeding during or after spraying).

- *Family members (indirect exposure)*: First of all, family members can be exposed to pesticides, which are improperly stored at home (e.g. in the kitchen), and through which other things (food, kitchenware, floor, walls) can get contaminated. Besides that, family members can get indirectly exposed to pesticide when an occupational pesticide user goes home after work and brings home residues of pesticides on his body, clothing and equipment (when this person does not bath himself after work, does not remove his work clothing and brings his equipment home). Family members who will have personal contact with exposed individuals, or his contaminated clothing or equipment, are indirectly exposed to pesticides. Pesticide residues can also be transferred from persons to the house (furniture, floor, walls, doorknobs).
- *Bystanders (indirect exposure)*: These are persons who are near the field when pesticides are being applied to the crop and are exposed to the spray drift. Bystanders can also be family members or neighbours / residents.
- *Neighbours (indirect exposure)*: These are persons who live close to fields or in areas where pesticides are being used and applied. They can indirectly be exposed to the spray drift (even around their house) and besides that to residues that get into the environment (water, soil) and into the food they consume. Children playing around the house and maybe in or near the fields can also be exposed to pesticides (e.g. playing with empty containers laying around, or playing in a field that has just been sprayed).

Make clear that you do not always realize that you are being exposed to pesticides!

To clarify the difference between direct and indirect exposure, you can use a the practical example of cigarette smoke:

You can be exposed to cigarette smoke in two ways:

- *Directly*: you are smoking a cigarette yourself and you are well aware that you are being exposed to cigarette smoke, inhaling the cigarette smoke into your lungs, which might cause lung cancer.
- *Indirectly*: although you are not a smoker, you can still be exposed to cigarette smoke when somebody else is smoking a cigarette and you are standing close. In that case you might not always be aware that your inhaling smoke of a cigarette into your lungs when somebody else is smoking. However, breathing in other people's smoke might also cause lung cancer.

How can people be exposed to pesticides?

Who are exposed to pesticides and how?

- Occupational pesticide users (direct)
 - Handling and applying pesticides
 - Working in field during or shortly after spraying



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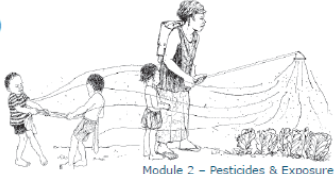
Module 2 – Pesticides & Exposure

Slide 14

How can people be exposed to pesticides?

Who are exposed to pesticides and how?

- Families of occupational pesticide users (indirect)
 - Pesticides stored at home
 - Residues brought home
 - Handling clothes with pesticide residues
- Bystanders (indirect)
 - Spray drift



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Module 2 – Pesticides & Exposure

Slide 15

How can people be exposed to pesticides?

Who are exposed to pesticides and how?

- Neighbours (indirect)
 - Spray drift
 - Residues in environment
 - Contaminated food or drinking water



You do not always realize that you are being exposed to pesticides!

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Module 2 – Pesticides & Exposure

Slide 16

Continue with explaining what determines the extent of exposure to pesticides (**Slide 17**). The exposure impact on the human body is related to three factors:

- *Dose*: the amount of the pesticide.
- *Time*: the length of time exposed to the pesticide.
- *Type*: the kind of pesticide (toxicity).

The relation between dose and time is called the Dose-Time Relationship, i.e. the damage pesticides can do to humans depends on the dose or the amount of pesticide a person has been exposed to and the time or duration of this exposure.

Besides the dose and time, also the toxicity of the pesticide is important, i.e. the type of pesticide to which a person is exposed to. A small amount of a very toxic pesticide will have a larger impact on the human body than a large amount of a practically non-toxic pesticide.

Continue with explaining the concept of toxicity (**Slide 18**):

- Toxicity is a measure of how poisonous a pesticide is to people or the environment.


- Not all pesticides are the same and some are more toxic than others. The toxicity differs per type of pesticide (mostly determined by the active ingredient of the pesticide).
- If you want to know how toxic a pesticide is, you can read that on the label, Mostly the classification of the World Health Organisation (WHO) is used, categorizing a pesticide in one of the hazard categories (this will be explained in more detail in 'Module 4: Pesticide Labels').

Extent of Exposure to Pesticides

Exposure impact

Exposure impact on the human body is related to:

- Amount of pesticide exposure (dose)
- Length of pesticide exposure (time)
- The kind of pesticide (type)
- The amount of a chemical a person is exposed to (dose) is as important as how toxic the pesticide is (type)


 Module 2 – Pesticides & Exposure


Slide 17

Extent of Exposure to Pesticides

Toxicity

- Toxicity is a measure of how poisonous a pesticide is to people or the environment
- Not all pesticides are the same and some are more toxic than others
- WHO classification toxicity on label:
 - Class Ia : extremely hazardous
 - Class Ib : highly hazardous
 - Class II : moderate hazardous
 - Class III : slightly hazardous
 - Class U : unlikely to be hazardous



 Module 2 – Pesticides & Exposure

Slide 18

To clarify the interrelated factors of dose, time and type, you can use practical example(s), depending on what your participants might find appropriate. Ask the participants to reflect on the example given before answering with the underlying explanation.

- **Alcohol:**
 - Consider how a person would feel drinking three beers in an hour. Now, consider how a person would feel drinking three beers in the course of a day.
 - Drinking three beers in an hour will likely make a person feel dizzy and less coordinated. Drinking three beers over the course of a day would not have the same effect as drinking three beers in an hour. In this case, the dosage (three beers) is the same, but the course of time (one hour vs. one day) is different.
 - Consider how person would feel drinking one litre of beer in an hour. Now consider how a person would feel drinking one litre of whiskey in an hour.
 - Drinking one litre of whiskey in an hour will likely make a person feel more dizzy and less coordinated than drinking one litre of beer. Drinking one litre of beer in an hour would not have the same effect as drinking one litre of whiskey in an hour. In this case the course of time (one hour) is the same, but the type of alcohol (beer vs. whiskey) is different.
- **Smoking:**
 - Consider how a person would feel smoking three cigarettes in an hour. Now, consider how a person would feel smoking three cigarettes in the course of a day.
 - Smoking three cigarettes over the course of a day would not have the same effect as smoking three cigarettes in an hour. In this case, the dosage (three cigarettes) is the same, but the course of time (one hour vs. one day) is different.

- Consider how person would feel smoking three cigarettes an hour. Now consider how a person would feel smoking three cigars in an hour.
 - Smoking three cigarettes in an hour would not have the same effect as smoking three cigars in an hour. In this case the course of time (one hour) is the same, but the type of smoke (cigarette vs. cigar) is different.

2.4 Module 3: Pesticides & Health


Learning Objectives

After this module participants:

- Understand that pesticides can be dangerous to our health and are actually poisons and hazardous chemicals instead of medicines.
- Understand that certain signs or symptoms can indicate that a person has been exposed to pesticides.
- Understand and can explain the difference between acute and chronic health effects.
- Realize that you can also be exposed to pesticides without even knowing or noticing it.
- Are able to name and recognize several signs and symptoms of acute pesticide poisoning.
- Realize that signs and symptoms of acute pesticide poisoning can also be caused by other factors.
- Are able to name and recognize several signs and symptoms of severe acute pesticide poisoning.
- Can name several chronic health effects.
- Realize and can explain that a pesticide can have different effects on people based on age, sex and other characteristics.
- Know that children, elderly people and (pregnant) women are most vulnerable to pesticides.
- Can come up with ways to reduce pesticide health risks.
- Know how to provide First Aid in case of acute pesticide poisoning.

Start this module with asking the participants if pesticides can be dangerous to our health. (**Slide 19**). Give the participants the opportunity to reply to this question or ask some of the participants to answer the question. If they answer 'yes', also ask why they think pesticides can be dangerous to our health. If they answer 'no', ask clarification for why they think so. Continue with giving the answer to the question by using **Slide 20**: YES! Pesticides can be dangerous to our health. Give explanation about the misconception that pesticides are sometimes perceived as a medicine, while these actually are hazardous chemicals: Pesticides are poisons!

Pesticides & Health

Can pesticides be dangerous to our health? 



Module 3 – Pesticides & Health

Slide 19

Pesticides & Health

Can pesticide be dangerous to our health?

YES!

Pesticide ≠ Medicine

Pesticide = Poison!




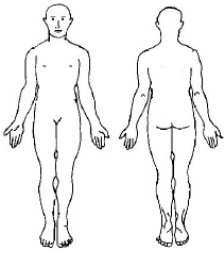


Module 3 – Pesticides & Health

Slide 20

Continue with asking the participants if they can indicated which parts of the body are being exposed to pesticides during (their) work and during what kind of (their) work activities (this is also somewhat of a repetition of the previous module on pesticides & exposure) (**Slide 21**). Give the participants the opportunity to reply to this question or ask some of the participants to answer the question. Alternatively you can have a short plenary discussion about this with the group, in which the participants can share their experiences on pesticide exposure. You can also use a flipchart to draw or write down the answers of the participants. Then use **Slide 22** to ask if the participants remember how pesticides can enter the body and how this relates to the parts of the body they indicated are being exposed to pesticides. What is their opinion or are their thoughts after combining these two pieces of information?

Pesticides & Health

Which parts of the body are being exposed to pesticides during work activities? 

Module 3 – Pesticides & Health

Slide 21

Pesticides & Health

Do you remember?



Skin absorption Ingestion Inhalation



Module 3 – Pesticides & Health

Slide 22

Suggestion for interactive assignment (slide 21): Pesticide Exposure During Work

Requisites:

- Coloured post-its
- Flipchart & Markers

1. Divide the participants in small groups.
2. Ask the participants to draw on a flipchart the outline of a human body.
3. Ask the participants to use post-it notes to indicate which parts of the body are being exposed to pesticides during work activities.
4. Discuss with the participants the results and what this does imply to their health, also in relation to the three ways pesticides can enter the body.

Continue with asking the participants how you can tell that someone has been exposed to pesticides (**Slide 23**). Give the participants the opportunity to reply to this question or ask some of the participants to answer the question. Alternatively let the participants first buzz in pairs for a few minutes. In the following slide (**Slide 24**) explain that certain signs or symptoms can indicate that a person has been exposed to pesticides. However, these signs and symptoms do not always have to occur: persons can also be exposed to pesticides without they even know or notice it.


Explain that there is a difference between:

- *Acute health effects (acute toxicity)*: implies the occurring of adverse health effects immediately or within 24 hours after exposure to a pesticide. Mostly occurs when a large dose of pesticide has entered the body at once.
- *Chronic health effects (long term / chronic toxicity)*: implies health problems over time that may arise from repeated or prolonged exposure to smaller doses of pesticide.

Pesticides & Health

how can you tell if someone has been exposed to pesticides?

?




Module 3 – Pesticides & Health

Slide 23

Pesticides & Health

- When a person has been exposed to pesticides, he/she can have one or more health signs or symptoms
- Persons can even be exposed to pesticides and not even know it!
- Acute health effects: immediate
- Chronic health effects: take place over time



Module 3 – Pesticides & Health

Slide 24

Continue with asking the participants if they could name signs and symptoms that may be caused by acute pesticide poisoning (**Slide 25**). Give the participants the opportunity to reply to this question or ask some of the participants to answer the question. Alternatively let the participants first buzz in pairs for a few minutes. You can also use a flipchart to draw or write down the answers of the participants. You can use the next slide (**Slide 26**) to verify their answers and provide the answer to

the question. Also ask the participants to share any own experiences with acute pesticide poisoning (Have they experiences themselves? Or from somebody close to them? Or maybe they have heard stories about it within the community?). Let the participants share their experiences and stories plenary with the group.

Pesticides & Health

Can you name signs and symptoms that may be caused by acute pesticide poisoning? ?

Do you have own experience with acute pesticide poisoning? ?

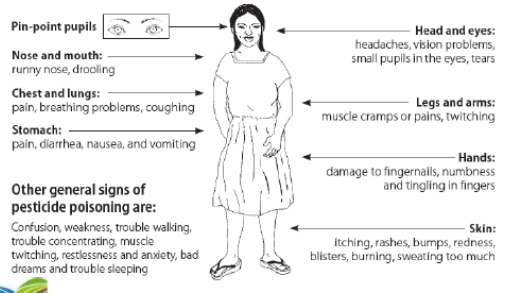
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Module 3 – Pesticides & Health

Slide 25

Pesticides & Health

Signs & symptoms of potential acute poisoning



Pin-point pupils:  **Head and eyes:** headaches, vision problems, small pupils in the eyes, tears

Nose and mouth: runny nose, drooling

Chest and lungs: pain, breathing problems, coughing

Stomach: pain, diarrhea, nausea, and vomiting

Legs and arms: muscle cramps or pains, twitching

Hands: damage to fingernails, numbness and tingling in fingers

Other general signs of pesticide poisoning are: Confusion, weakness, trouble walking, trouble concentrating, muscle twitching, restlessness and anxiety, bad dreams and trouble sleeping

Skin: itching, rashes, bumps, redness, blisters, burning, sweating too much

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Module 3 – Pesticides & Health

Slide 26

Suggestion for interactive assignment (slide 25): Pesticide Signs and Symptoms

Requisites:

- Coloured post-its
- Flipchart & Markers

1. Divide the participants in small groups.
2. Ask the participants to draw on a flipchart the outline of a human body.
3. Ask the participants to use post-its to indicate where they experience problems when they are in the field, spraying or doing other activities. They can add on the post-it what kind of complaints they experience.
4. Discuss with the participants the results and ask if any of the complaints they have could be a result of their exposure to pesticides.

Also tell the participants that it is important to realize that many of the signs and symptoms may also be caused by diseases, working conditions (i.e. headache can also come from working in the field when it is hot and the worker is exposed to sun with insufficient intake of water), other chemicals, or environmental conditions (**Slide 27**). So when a sign or system is observed this does not directly imply that a person has been exposed to a pesticide. However, when a person has been working with pesticides and one of the signs or symptoms occurs, keep in mind that this may be a case of pesticide poisoning!

Pesticides & Health

Remember:
many of these signs & symptoms may also be caused by disease, other chemicals, or environmental conditions!



Module 3 – Pesticides & Health

Slide 27

With **Slide 28** explain that there are also signs and symptoms that indicate severe acute poisoning, for which direct action needs to be undertaken. Name and discuss these symptoms with the group. When a person has been working with pesticides and he inhaled or swallowed a pesticide or has spilled pesticide on his body, and any of these signs and symptoms are observed or occur, take action immediately!

In next slide (**Slide 29**) explain in more detail about the occurrence of chronic health effects of pesticide exposure. These health effects usually reveal themselves only after a longer period of repeated or prolonged exposure to smaller doses of pesticide. Initially you notice nothing, but then suddenly you get certain symptoms and become sick. However, at that point it is mostly too late, as the damage is already done. And even then these symptoms can be mistaken for other causes or can be identified as other illnesses. Furthermore, you might not even know or noticed that someone is being poisoned, as signs and symptoms of repeated or prolonged exposure to smaller doses of pesticide will develop slowly and will only become apparent over a longer period of time.


Pesticides & Health

Signs & symptoms of severe acute poisoning

- Inability to breathe
- Chemical burns on skin
- Unconsciousness
- Loss of control over bladder and bowels
- Loss of reflexes
- Uncontrollable muscle twitching
- Blue lips and fingernails
- Convulsion

Severe poisoning can seriously injure or even cause death!

Take action immediately!




Module 3 – Pesticides & Health

Slide 28

Pesticides & Health

Chronic health effects

- Long-term health effects occur from regular contact with pesticides over weeks, months, or years
- At first you will not notice anything, until you suddenly get sick
- Long term effects of pesticides are mostly mistaken for other causes
- Pesticide poisoning can look like other illnesses!
- You might not even know someone was poisoned because the signs can develop slowly



Module 3 – Pesticides & Health



Slide 29

Continue with asking the participants if they could name or think of any chronic health effects or diseases related to regular contact with pesticides (**Slide 30**). Give the participants the opportunity to reply to this question or ask some of the participants to answer the question. Alternatively let the participants first buzz in pairs for a few minutes. You can also use a flipchart to draw or write down

the answers of the participants. Use the next slide (**Slide 31**) to verify their answers and provide the answer to the question. Maybe they have experiences themselves, or from somebody close to them, or maybe heard stories about it within the community?

Pesticides & Health

Can you name or think of any health effects or diseases related to regular contact with pesticides?


Module 3 – Pesticides & Health

Slide 30

Pesticides & Health

Chronic health effects

- Cancer
- Damage to lungs (coughing, asthma)
- Damage to nerve system (memory loss, loss of coordination)
- Damage to immune system (more susceptible to disease)
- Damage to reproduction system (infertility, birth defects)
- Dermal disorders (skin cancer, allergies, irritations)




Module 3 – Pesticides & Health

Slide 31



Then ask the participants 1) if the exposure to a pesticide would have the same effect on a child as it would have on an adult and why, and 2) if the exposure to a pesticide would have the same effect on a female as it would have on a male and why (**Slide 32**). Give the participants the opportunity to reply to the first question, before asking the second question. Or ask some of the participants to answer one of the questions. Alternatively let the participants first buzz in pairs for a few minutes.

Pesticides & Health

Does exposure to a pesticide have the same effect on a child as it would have on an adult (why?)



Does exposure to a pesticide have the same effect on a female as it would on a male (why?)

Module 3 – Pesticides & Health

Slide 32

Continue with explaining that a pesticide can have different effects on people (**Slide 33**) depending on certain characteristics like e.g. age, sex, weight, pregnancy, health status, nutrition status.

Children, elderly people and (pregnant) women are most vulnerable to pesticides! Some examples of facts to substantiate this are:

- *Children*: 1) their internal organs are still developing and maturing, pesticides can disturb this development process; 2) in relation to their body weight, infants and children eat and drink more than adults, possibly increasing their exposure to pesticides in food and water; 3) certain


behaviour, such as playing on floors or putting objects in their mouths, increase a child's exposure to pesticides.

- *Elderly people:* 1) our skin becomes thinner as we age and thus pesticides enter more quickly through the skin of older adults and may cause an older person to absorb more of a pesticide compared to a younger person; 2) the ability of the heart to move blood around the body declines as we age, which reduces the blood flow to the liver and kidneys and decreases the size of these organs, which slows the break down and removal of pesticides from the body; 3) the body stores many pesticides in fat before they are removed from the body by the liver or kidneys, people tend to gain body fat and lose lean muscle as they age and thus pesticides can more easily accumulate in the body
- *Pregnant women:* 1) during pregnancy the baby's brain, nervous system, and organs are developing rapidly and can be more sensitive to the toxic effects of pesticides, which can lead to birth defects, and e.g. low birth weight, mental and motor delay and reduced IQ; 2) after giving birth pesticide residues in breast milk can be transferred to the baby when breastfeeding.

Pesticides & Health

Type of Person

- Age, sex, weight, pregnancy, health status, nutrition status
- Children, elderly people and (pregnant) women are most vulnerable!


Module 3 – Pesticides & Health

Slide 33

Also note that preconception pesticide exposure of either the mother or father may have an effect on reproductive outcome and offspring and it can possibly reduce both male and female fertility!

The next slides give examples of the effects of pesticides on health: 1) birth defects due to endosulfan during pregnancy (**Slide 34**) and 2) skin injuries caused by paraquat (**Slide 35**). Before showing slides 34 and 35 make sure to mention to the participants that the images can be disturbing.

Pesticides & Health

Effects of endosulfan (India)



Birth defects in children of mothers exposed to endosulfan during pregnancy

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Module 3 – Pesticides & Health

Slide 34

Pesticides & Health

Skin injuries caused by paraquat (China)



Source: <http://www.spandidos-publications.com/etm/6/6/1504>

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Module 3 – Pesticides & Health

Slide 35


To conclude this module finish with asking the participants if they can think of ways to reduce pesticide health risks (**Slide 36**). Give the participants the opportunity to reply to this question or ask some of the participants to answer the question. Alternatively let the participants first buzz in pairs for a few minutes.

Additionally you can provide them with the following reminder:

$$\text{Pesticide health risk} = \text{TOXICITY} \times \text{EXPOSURE}$$

Continue with explaining that if you take a look at the ‘formula’ you can either reduce TOXICITY, or reduce EXPOSURE, or both in order to reduce pesticide health risk for a person. Check with the participants if the solutions they came up with also fall within one of these two ‘categories’ and then also provide them with some examples (**Slide 37**).

Pesticides & Health

How can pesticide health risks be reduced? 

Remember!

Pesticide health risk for a person = TOXICITY x EXPOSURE

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Module 3 – Pesticides & Health

Slide 36

Pesticides & Health

How can pesticide health risks be reduced?

Remember!

Pesticide health risk for a person = TOXICITY x EXPOSURE

- **Reduce EXPOSURE** for example:
 - avoid contact as much as possible
 - protect yourself
 - use less pesticides
- **Reduce TOXICITY** for example:
 - use less toxic pesticides

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Module 3 – Pesticides & Health

Slide 37


2.4.1 First AID Acute Pesticide Poisoning

This is an additional module that can be used to inform the participants about First Aid in case of acute pesticide poisoning. It provides brief instructions on what to do in case of pesticide poisoning for the following types of poisoning:


- Skin exposure
- Chemical burns of the skin
- Eye exposure
- Inhalation exposure
- Oral exposure

First Aid instructions only give advice to a limited extent on the first actions in case of pesticide poisoning and that always medical attention must be sought! Important is that participants know that, in case of suspected poisoning, they have to bring the label to the clinic and show it to the doctor.

MODULE 3




Acute pesticide poisoning



Module 3 – Pesticides & Health

Slide 38

Pesticides & Health




FIRST AID for acute pesticide poisoning

WARNING:
If at all possible, do not allow any pesticide to get on you while you are helping the victim!

Skin exposure

- The faster the poison is washed off the patient, the less injury will result
- Remove clothing
- Wash the affected skin with large amounts of water
- Wash skin and hair thoroughly with soap and water
- Dry and wrap the victim in a blanket
- Seek medical attention!



Module 3 – Pesticides & Health

Slide 39

Pesticides & Health



FIRST AID for acute pesticide poisoning

Chemical burns of skin

- Remove victims contaminated clothing
- Wash the burned areas with large amounts of water
- Cover burned area with a loosely-applied clean cloth
- Do not apply any drugs or medications (e.g. creams, lotions, powders) to the burned area
- If the victim is in shock, keep the person lying down and warm
- Seek medical attention!



Module 3 – Pesticides & Health

Slide 40

Pesticides & Health



FIRST AID for acute pesticide poisoning

Eye exposure

- It is most important to wash the eye out as quickly, but as gently, as possible
- Hold the eyelids open and rinse eyes with large amounts of clean water
- Continue washing for 15 minutes or more
- Do not use chemicals or drugs in wash water
- Seek medical attention!



Module 3 – Pesticides & Health

Slide 41

Pesticides & Health

FIRST AID for acute pesticide poisoning

Inhalation exposure

- If the victim is in an enclosed space, do not go in after them without proper respiratory equipment
- Carry patient to fresh air immediately. Open all doors and windows
- Loosen tight clothing
- If patient is convulsing, watch their breathing and keep their chin up so their air passage will remain free for breathing
- Prevent chilling (wrap patient in blankets but do not overheat)
- Keep patient as quiet as possible
- Seek medical attention!

Module 3 – Pesticides & Health


Slide 42

Pesticides & Health

FIRST AID for acute pesticide poisoning

Oral exposure

- In general the recommendation is to not induce vomiting
- Usually the label will advise you in the First Aid statement whether a person who has swallowed pesticide should be made to vomit
- If the patient is retching or vomiting, place the patient face down with their head lower than their body in the recovery position; this prevents vomit from entering the lungs; do not let the patient lie on their back; clean the vomit from the patient
- Seek medical attention! A doctor may recommend activated charcoal be administered to adsorb any remaining pesticide in the stomach

Module 3 – Pesticides & Health

Slide 43

Suggestion for interactive assignment (Slide 38-43): First Aid Play

Requisites:

- Volunteer / actor
1. Have a volunteer or actor pretending he/she is suffering from acute pesticide poisoning (one on the five types of poisoning)
 2. Let one of the participants apply First Aid
 3. Discuss afterwards the performed procedure

2.5 Module 4: Pesticide Labels

Learning Objectives

After this module participants:

- Understand the difference between the trade name and the name of the active ingredient of a pesticide and understand why it is important to know the difference.
- Can name what kind information can be found on the label of a pesticide product.
- Understand the information that can be found on the label of a pesticide product and know how to read and interpret the information.
- Can identify by the colour code on a pesticide label how hazardous a pesticide is.
- Can identify by the symbols on a pesticide label what kind of protection measures to take for mixing and applying the pesticide and whether it poses a danger to children, animals or the environment.

Start this module with showing the participants **Slide 44**, asking them if they know the difference between these three pesticides and if they would consider mixing them together in one knapsack to spray it on a crop. Give the participants the opportunity to reply to this question or ask some of the participants to answer the question. With another click the active ingredients become visible and these appear to be the same for all three products (**Slide 45**). Explain that actually the products are the same and only the products' trade names differ. Farmers sometimes mix together pesticides with different trade names, but with the same active ingredient, presuming that these are different types of pesticides. However, in fact they only double (or triple!) the dosage.

Pesticide Labels

➤ What is the difference between these pesticides?

➤ Would you consider mixing them in one tank?

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Module 4 - Pesticide Labels

Slide 44

Pesticide Labels

active ingredient: Beta-cyfluthrin active ingredient: Beta-cyfluthrin active ingredient: Beta-cyfluthrin

➤ What is the difference between these pesticides?

➤ Would you consider mixing them in one tank?

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Module 4 - Pesticide Labels

Slide 45

Continue with explaining that a pesticide product can be named in two ways (**Slide 46**):

- According to their trade name
- According to the name of the active ingredient.

Explain that a trade name is just a popular advertising name and a way for the pesticide manufacturers to differentiate their product from competing manufacturers (marketing). The name of the active ingredient actually provides information on the type of product and on the main

ingredient of the pesticide which actually kills or controls the target pest. Although trade names of two products can be different, still the active ingredient can be the same! Take the picture of the pesticide Roundup as an example and ask the participants if they can tell the trade name and the active ingredient of this product (**Slide 47**). You may also note to the participants that the trade name is always very well visible on the label, however for the active ingredient you should examine the label more closely as it is mostly given in small print on the label.

Pesticide labels


Pesticide names

Pesticides can be named in two ways:

- The trade name
- The name of the active ingredient

Active ingredient: The active ingredient is the part of the pesticide that kills or controls the target pest

You can find out what the active ingredient is by reading the label!



Module 4 – Pesticide Labels

Slide 46

Pesticide labels

Example

- Trade name:
Round Up
- Chemical name of the active ingredient:
Glyphosate




Module 4 – Pesticide Labels

Slide 47

Continue with asking the participants if they can name what kind of (other) information can be found on a pesticide label (**Slide 48**). Give the participants the opportunity to reply to this question or ask some of the participants to answer the question. If the participants do not know the answer you can say that two of the things that we can find on the label, were already discussed, i.e. the trade name and the active ingredient. What else can be found on the label? Continue with giving the answer to the question by using **Slide 49**. The most important information items on the pesticide label are:

- Active ingredient(s)
- Recommended rates for use (dosage)
- Directions for use
- Colour coding and warning symbols

Pesticide labels

What kind of information can you find on a pesticide label?




Module 4 – Pesticide Labels

Slide 48

Pesticide labels

What kind of information can you find on a pesticide label?

- Product name
- Active ingredient(s)
- Name & address of manufacturer
- Recommended rates for use
- Directions for use
- Expiration data
- Colour coding and warning Symbols!




Module 4 – Pesticide Labels

Slide 49

In the following slides more information is given on colour coding, activity & advice symbols and warning symbols.



Explain that the colour coding on the label of a pesticide indicates how hazardous / toxic a pesticide is. The classification is based on the WHO hazard classification of pesticides, which is compiled from toxicity research on rats. Each colour represents a hazard level (**Slide 50**):

- *Class 1a* - *Brown* : Extremely hazardous
- *Class 1b* - *Red* : Highly hazardous
- *Class II* - *Yellow* : Moderate hazardous
- *Class III* - *Blue* : Slightly hazardous
- *Class U* - *Green* : Unlikely to be hazardous


Pesticide labels

Colour coding

- WHO classification of pesticides corresponds with colour
- The colour indicates how hazardous the pesticide is!

KELAS	WARNA LABEL	SIMBOL	MAKNA
Ia			SANGAT BERBAHAYA SEKALI
Ib			SANGAT BERBAHAYA
II		X	BERBAHAYA
III			CUKUP BERBAHAYA
U			TIDAK BERBAHAYA JIKA DIPAKAI NORIMAL

Class Ia : extremely hazardous
 Class Ib : highly hazardous
 Class II : moderate hazardous
 Class III : slightly hazardous
 Class U : unlikely to be hazardous


Module 4 – Pesticide Labels

Slide 50

Besides colour coding, the label also shows several symbols. There are activity symbols indicating when to protect yourself (mixing and application) with corresponding advice symbols showing what kind of protection measures to take (**Slide 51**). Furthermore it contains warning symbols, indicating that e.g. the pesticide should be kept locked away and out of reach of children, or can be dangerous to animals or the environment (**Slide 52**). Briefly explain the meaning of each symbol in Slides 51 and 52.

Pesticide labels

Activity & advice symbols

➤ Symbols indicate when to protect yourself ...

... and how you should protect yourself

Module 4 – Pesticide Labels

Slide 51

Pesticide labels

Warning symbols

➤ Symbols indicate to safely store Pesticides...

...and indicate the danger to the environment

Module 4 – Pesticide Labels

Slide 52

The next slide shows the participants an example of the symbols on a pesticide label (**Slide 53**). Ask the participants if they can tell the meaning of each symbol, in following order from number 1 to number 10. Give the participants the opportunity to reply or ask some of the participants if they now the meaning of the symbol. With each click an answer becomes visible.

Pesticide labels

Colour coding & symbols

What is the meaning of each symbol?

Module 4 – Pesticide Labels

Slide 53

Pesticide labels

Colour coding & symbols


What is the meaning of each symbol?

Module 4 – Pesticide Labels

Slide 54

To summarize and repeat the information on pesticide labels, continue with an assignment (**Slide 55**). Hand out several print outs of pesticide labels of different pesticide products and let the participants discuss in pairs for a few minutes about what kind of pesticide it is, what it is used for, what is the active ingredient, how hazardous the pesticide is, what are the instructions for using the pesticide and if there is anything on first aid in case of poisoning with the pesticide. Afterwards, ask the pairs to share to the group their findings and give a summary of the information on the label they received.


Assignment




With handed out pesticide labels

➤ Identify the pesticide and tell the group:

- what kind of pesticide it is
- what it is used for
- what is the active ingredient
- how hazardous the pesticide is
- what are the instructions for using the pesticide
- first aid




Module 4 – Pesticide Labels

Slide 55

Suggestion for interactive assignment (slide 55): Reading & Understanding Pesticide Labels

Requisites:

- Examples of pesticide labels
- Flipchart & coloured markers
- Masking tape

1. Hand out several print outs of pesticide labels of different pesticide products with different colour codings.
2. Let the participants discuss in pairs for a few minutes answering the following questions: What kind of pesticide is it? What is it used for? What is the active ingredient? How hazardous is the pesticide? What are the instructions for using the pesticide? Are there any instruction for first aid in case of poisoning?
3. Ask the pairs to share plenary their findings and give a summary of the information on the label they received.

Finalize this module by asking to the participants when to consult the pesticide label (**Slide 56**). Give the participants the opportunity to reply to this question or ask some of the participants to answer the question. Continue with giving the answer to the question by using **Slide 57**. The pesticide label should be consulted before:

- *Buying the pesticide:* Before you buy a pesticide make sure that you are buying the right pesticide for controlling the intended pest and that it is allowed to and can be used for the intended crop.
- *Transport, mix or load the pesticide:* Before you transport, mix or load the pesticide product, make sure you know the safety measures to take for transport, and the protection measures to take during mixing and loading. Furthermore, consult the label on the right dosage, the use for controlling the intended pest and for the intended crop.
- *Applying the pesticide:* Before applying the pesticide, make sure you know the protection measures to take during application (spraying) of the pesticide.
- *Storing the pesticide:* Before storing the pesticide, make sure you know the safety measures to take for storage (e.g. keep out of reach of children, store in a dry place).

- *Disposing unused pesticide:* Before disposing unused pesticide or pesticide waste (e.g. empty containers), make sure you know the right and safe way to dispose the waste of the pesticide product.

Mention again explicitly that it is very important to always follow the instructions on the label in order to protect yourself, your surroundings and the environment and minimize the impact from pesticides.

Pesticide labels

When to read a pesticide label?




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Module 4 – Pesticide Labels

Slide 56

Pesticide labels

When to read a pesticide label?

- Before you buy the pesticide
- Before you transport, mix or load the pesticide
- Before you apply the pesticide
- Before you store the pesticide
- Before you dispose unused pesticide

Always follow the label instructions!



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Module 4 – Pesticide Labels

Slide 57

2.6 Module 5: Safe Pesticide Handling

Learning Objectives

After this module participants:

- Can name the 5 golden rules for safe use of pesticides.
- Know what are the (basic) protective work clothing (PWC) to wear and personal protective equipment (PPE) to use when working with pesticides.
- Know they can find on the label of a pesticide product the required protection to use when working with a pesticide.
- Can explain the concept of Restricted Entry Interval (REI) and how to apply it.
- Know how they can protect others (family, neighbours, labourers) from being exposed to pesticides.

Start this module with asking the participants if they could think of any rules for the safe use of pesticides (**Slide 58**). Give the participants the opportunity to reply to this question or ask some of the participants to answer the question. Alternatively let the participants first buzz in pairs for a few minutes. You can write the answers of the participants on a flipchart. Continue with giving the answer to the question by using **Slide 59** and present the 5 golden rules for safe use of pesticides:

1. Before using any crop protection product, always read the label and make sure you understand and follow all safety needs
2. Handle crop protection products carefully at all times to avoid contact or contamination
3. Use appropriate protective clothing as last line of defence and not to become careless and increase exposure risks
4. Practice good personal hygiene
5. Maintain sprayers well, fixing, for example, any leaks before starting an application

You can tell the participants that the first two rules were already discussed in the previous modules. In this module we will discuss appropriate work clothing and protection. In the next module good personal hygiene related to pesticide use will be discussed.

5 golden rules for safe use of pesticides

What do you think are the rules for safe use of pesticides?





Module 5 – Safe Pesticide Handling

Slide 58

5 golden rules for safe use of pesticides

1. Before using any crop protection product, **always read the label** and make sure you understand and follow all safety needs
2. Handle crop protection products carefully at all times to **avoid contact or contamination**
3. Use **appropriate protective clothing** as last line of defence and not to become careless and increase exposure risks
4. Practice **good personal hygiene**
5. **Maintain sprayers well**, fixing, for example, any leaks before starting an application



Module 5 – Safe Pesticide Handling

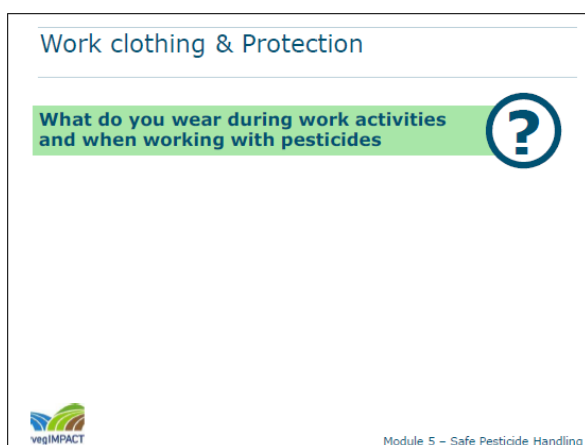
Slide 59

Continue with asking the participants what kind of clothing and / or equipment they wear during 1) work activities and 2) when working with pesticides (**Slide 60**). Give the participants the opportunity to reply to this question or ask some of the participants to answer the question. You can have a short plenary discussion on why they wear these kind of clothing and / or equipment. Continue with **Slide 61**, showing what in general people wear while working with pesticides. Explain that commonly protection mostly only consists out of a piece of cloth or an old t-shirt to cover mouth and nose. Ask the participants whether they think if this provides sufficient protection. Give the participants the opportunity to reply to this question or ask some of the participants to answer the question. If they answer with yes or no also ask for a clarification.

Continue with explaining that most of the protective equipment is used for other reasons than for protection against exposure to pesticides (e.g. protection against sun or dust) and are therefore not always geared for this purpose. Continue with the second part of **Slide 61**, showing what at least should be worn when working with pesticides:

- *Hat*: protection of head and forehead against skin absorption.
- *Mask*: protection of respiratory tract against inhalation exposure.
- *Long sleeves*: protection of arms against skin absorption and chemical burns.
- *Rubber gloves*: protection of hands against skin absorption and chemical burns.
- *Long trousers*: protection of legs against skin absorption and chemical burns.
- *Rubber boots*: protection of feet against skin absorption and chemical burns.

Explain to the participants that most of the protective clothing / equipment mentioned above aims to protect against skin exposure to pesticides. As we have seen before, skin absorption is the most common type of exposure, and therefore is the most important aspect to keep in mind when you are protecting yourself against pesticide exposure.



Slide 60




Slide 61

For comparison show **Slide 62**, which shows what you should wear to fully protect yourself against pesticides. Make the remark that although this is the ideal situation, it might not always be the most practical one, e.g. considering the hot climate or expensive protection equipment.

Work Clothing & Protection

What you should wear for full protection!



Visor / Goggles
 Respirator with special filters
 Full body water resistant coverall
 Thick rubber gloves
 Rubber boots

**This is the ideal situation!
But not always the most practical!**

vegIMPACT Module 5 – Safe Pesticide Handling

Slide 62

Continue with **Slide 63 and 64** explaining what to wear during work, and what to wear when working with pesticides. Make clear the difference between basic work clothing and protective work clothing (PWC) & Personal Protective Equipment (PPE). PWC and PPE consist of:

- *Waterproof hat*
- *Rubber boots*
- *Waterproof apron*
- *Waterproof coverall*
- *Rubber gloves*
- *Goggles*
- *Respirator*

Work Clothing & Protection

What to wear during work?

Basic work clothing:

- Long sleeved shirt
- Long pants
- Shoes or boots
- Socks
- Hat



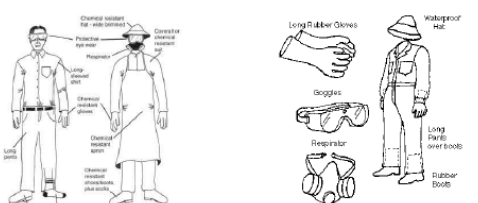
vegIMPACT Module 5 – Safe Pesticide Handling

Slide 63

Work Clothing & Protection

What to wear when working with pesticides?

- Protective Work Clothing (PWC)
- Personal Protective Equipment (PPE)



vegIMPACT Module 5 – Safe Pesticide Handling

Slide 64


Note that before mixing or spraying, always the pesticide label needs to be consulted on what kind of protection to use (**Slide 65**). As we have discussed before ('Module 4: Pesticide labels') activity symbols (mixing and application) with corresponding advice symbols can be found on the label showing what kind of protection measures to take. Check with the participants if they still know the meaning of the symbols. Furthermore, also explain that not only the people who mix or apply the

pesticides should use protective clothing and equipment, but also the people who work in the field during or shortly after pesticides application, as they are exposed to pesticides in the same way. Point out that it is of course always better to make sure no people are working in the field during or shortly after pesticides are applied.

With **Slide 66** explain that protective clothing may be uncomfortable, however more important, it reduces exposure to pesticides and can save your life! Furthermore, stressed upon before is the fact that skin absorption is the most common type of exposure to pesticides and poses the highest risk. So, try to cover up as much skin as possible! The picture in this slide shows the hands of a person who has been working with pesticides without using gloves. Pesticide residues on skin can be made visible by means of a black light, which appear to be present in abundances on the hands of this person (white glow in the picture).

Work Clothing & Protection

➤ Before mixing or spraying, always consult the pesticide label for protection requirements!



➤ When a fieldworker is working in the field during or shortly after pesticides are applied, the fieldworker should use the same PWC and PPE as the pesticide applicator!

vegIMPACT Module 5 – Safe Pesticide Handling


Slide 65

Work Clothing & Protection

➤ Protective clothing may be uncomfortable, but it can save your life!

➤ Exposed, unprotected skin poses highest risk when applying pesticides!

So do cover up and wear long sleeved clothing, apron and gloves!



vegIMPACT Module 5 – Safe Pesticide Handling

Slide 66

Suggestion for interactive assignment (Slide 60-66): Using PPEs

Requisites:

- Water sensitive paper or Flipchart (size 2.5 cm x 7.5 cm)
- Paper clip
- Water
- Food colour agent
- Knapsack sprayer
- Bucket


1. Put water in a bucket, add a few drops of food colour agent and mix it.
2. Load the knapsack sprayer with the colour solution .
3. Ask two volunteers to simulate spraying and weeding activities in the field.
4. Put pieces of flipchart paper or water sensitive paper on the shoulder, hands, clothes, head, back and any other parts of the body of the volunteers.
5. Start the simulation of spraying and weeding activities.
6. Ask the other participants to observe where the coloured water becomes visible on the body of both volunteers.
7. Discuss the results from this exercise and discuss the importance of using PPEs.

Continue with **Slide 67** and explain that good quality protective clothing and equipment are not always available or are relatively expensive. If there is no access to these products, then homemade alternatives can be used. Discuss some of these alternatives provided in Slide 67.

Work Clothing & Protection

What if good work clothing and PPE are not available?

- Use plastic bags to replace gloves. *Use them once.* Dispose them as pesticide waste
- An apron can be made out of a heavy duty plastic sack
- A mask can be made out of an empty clear plastic drinking bottle and string



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Module 5 – Safe Pesticide Handling

Slide 67

Continue with asking the participants when they go back into the field after spraying (**Slide 68**). Give the participants the opportunity to reply to this question or ask some of the participants to answer the question. Also ask the participants for the reason(s) why.

With the next slide explain to the participants the concept of Restricted Entry Interval (REI) (**Slide 69**):

The length of time required after spraying of pesticides, before a person can again safely enter the field without personal protective equipment

Explain that after spraying the field it still remains dangerous to enter and that the toxicity level will only slowly decline, depending on the type of pesticide used. For this reason the field should be kept a restricted area for all persons during the time interval (REI) until it is again safe to enter. This means no workers should be in the field during or after the crop is sprayed. The length of the REI varies depending on the type of pesticide used (toxicity level) and may vary from 4 hours to 3 days.

Restricted Entry Interval (REI)

After spraying, when do you go back into the field?



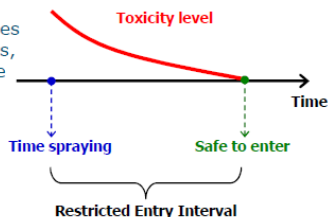
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Module 5 – Safe Pesticide Handling

Slide 68

Restricted Entry Interval (REI)

- The length of time required after spraying of pesticides, before a person may again enter the field without personal protective equipment (PPE).
- This means no fieldworkers in the field, during or after the crop is sprayed!
- The length of REI varies from 4 hours to 3 days, depending on the type of pesticide used



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Module 5 – Safe Pesticide Handling

Slide 69

Suggestion for interactive assignment (Slide 68-69): Restricted Entry Interval


Requisites:


- Room fragrance or deodorant spray
1. Spray the room with room fragrance or deodorant spray before the participants enter the room.
 2. Then, ask the participants what they smell and how long they think it will take before the smell disappears.
 3. Make the link to the Restricted Entry Interval and the use of pesticides and have a discussion with the participants. What do they think of labourers entering the field shortly after spraying?

Finalize this module with asking the participants, after having heard the information on the topic of safe pesticide handling, what they think they can do to protect others (family, neighbours, labourers) from being exposed to pesticides (**Slide 70**). Give the participants the opportunity to reply to this question or ask some of the participants to answer the question. Alternatively you can let participants discuss among each other (in small groups or pairs) if they can come up with any measures for protecting others. Let the participants share their findings plenary with the group. You can also use a flipchart to write down some of the findings of the participants. Continue with **Slide 71**, showing some possible measures for protecting others.

Protecting others

What can you do to protect others (family, neighbours, labourers) ?







Module 5 – Safe Pesticide Handling

Slide 70

Protecting others

- Spray at the end of the day!
- Do not allow anybody in the field till at least the next morning!
- Do not have women working in the field during spraying!
- Don not spray if there is a strong wind!
- Restricted Entry Interval (REI) is not being followed!





Module 5 – Safe Pesticide Handling

Slide 71

2.7 Module 6: Pesticides & Hygiene

Learning Objectives


After this module participants:


- Know what personal hygiene rules to follow and corresponding actions to take after working with or getting in contact with pesticides during work.
- Understand that personal hygiene rules and actions will not only protect themselves, but also their family members.

Start this module with asking the participants if they can share how a working day for them looks like and what they do for personal hygiene before and after work (**Slide 72**). You can let individual participants answer the question and share with the group, or have a short plenary discussion to collect from the participants what is common. Write down the results of the discussion on a flipchart.

Continue with **Slide 73 and 74** and explain the personal hygiene rules to follow and actions to take after having worked with or have been in contact with pesticides during work. Emphasize that these personal hygiene rules and actions will not only protect themselves, but also their family members (see also Module 2, Slide 15)!

Personal Hygiene & Pesticides

How does a working day look like and what do you do for personal hygiene before and after work? 





Module 6 – Pesticides & Hygiene

Slide 72

Personal Hygiene & Pesticides

When you have worked with or came into contact with pesticides during work:

- Wash hands with soap and water before eating, drinking and smoking
- Wash hands with soap and water before entering the house
- Take shoes off and change clothes after working with pesticides or in fields that have been contaminated with pesticides before entering the house






Module 6 – Pesticides & Hygiene

Slide 73

Personal Hygiene & Pesticides

- Shower / bath / rinse off immediately after working with pesticides or in areas where pesticides have been applied
- Keep work clothes separate from other clothes
- Wash work clothes separately from the rest of the family clothes
- Keep out of contact with family members until after getting cleaned up

Module 6 – Pesticides & Hygiene

Slide 74

2.8 Module 7: Disposal of Pesticide Waste

Learning Objectives

After this module participants:



- Are familiar with proper ways to dispose empty pesticide containers.
- Are aware that improper disposal of empty pesticide containers can cause risks to the environment, humans and animals.
- Can apply the triple rinse procedure for rinsing empty pesticide containers.

Start this module with asking the participants how they normally dispose empty pesticide waste and other pesticide waste (**Slide 75**). Give the participants the opportunity to reply to this question or ask some of the participants to answer the question. Continue with **Slide 76** and explain the proper way to dispose pesticide waste. Especially emphasize that empty containers should never be re-used and that pesticide waste which is not being disposed of in the right way can cause a risk to the environment, humans and animals!

Finalize this module with **Slide 77** explain how to correctly rinse an empty pesticide container, the triple rinse procedure, which is part of proper pesticide waste disposal.

Disposal of Pesticide Waste

How do you dispose empty pesticide containers and other pesticide waste?






Module 7 – Disposal of Pesticides Waste

Slide 75

Disposal of Pesticide Waste

- **Never re-use empty pesticide containers!**
- After rinsing containers should be punctured to stop potential reuse and should be properly disposed of
- If a recovery scheme for empty pesticide containers is available, make use of it!
- Alternatively bury the containers (1 meter)
- Always ensure proper disposal of empty pesticide containers, otherwise it causes a risk to the environment, humans and animals

Module 7 – Disposal of Pesticides Waste

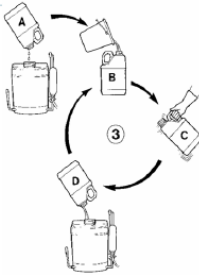
Slide 76

Disposal of Pesticide Waste

Triple Rinse Containers

- Drain the container
- Add clean water 25-30% of container capacity
- Replace cap firmly and shake vigorously for at least 30 seconds
- Empty rinsing into spray tank and drain container for 30 seconds
- Spray the rinsing in the field

Repeat steps B-D at least 3 times (until rinse water is clear) & wear protection during cleaning!



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Module 7 – Disposal of Pesticides Waste

Slide 77

2.9 Module 8: Storage of Pesticides

Learning Objectives

After this module participants:

- Are familiar with proper ways to store pesticides and especially where not to store them.
- Understand to keep pesticides out of reach of children and animals.
- Understand that a simple locked box mounted on the wall is a good and safe way to store small amounts of pesticides in the house.


Start this module with asking the participants how and where they store pesticides (and spraying equipment) at home (**Slide 78**). Give the participants the opportunity to reply to this question or ask some of the participants to answer the question. In the same slide show them some pictures of how pesticides sometimes are stored at home. Equipment and pesticide containers are often stored in the house, mostly not in a locked place. Ask the participants what they think about this and whether they think these are good ways to store pesticides and equipment. Why do they think so?

Furthermore, sometimes seedlings for the next season are stored in or around the house and are sprayed with fungicides to protect them from fungal rots (in this case for shallot), whereby family members are directly exposed to pesticides. Ask the participants if they practice similar ways of storing seeds or seedlings and what they think about this. Is this a good way to store seeds or seedlings at home? Why do they think so?

Continue with **Slide 79** explaining what to take into account when storing a pesticide in the house.

Storage of Pesticides

How and where do you store pesticides (and spraying equipment) at home?



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Module 8 – Storage of Pesticides

Slide 78

Storage of Pesticides

Storing pesticides safely:

- Keep pesticides and other chemicals out of reach of children and animals
- Keep pesticides in their original container
- Always store pesticides in a locked room or locked box
- Do not store pesticides in the kitchen, keep them away from water sources and places where food is stored or prepared

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Module 8 – Storage of Pesticides

Slide 79

Finalize this module with **Slide 80** presenting an example of a simple solution for storing small amounts of pesticides in the house: a simple locked box mounted on the wall.

Storing pesticides safely

➤ A simple locked box mounted on the wall away from the reach of children is appropriate for the safe storage of small product volumes



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Module 8 – Storage of Pesticides

Slide 80


2.10 Final Assignment

After completing all Occupational Pesticide Exposure & Health training modules you may choose to do a final assignment with the participants, with which you can challenge the participants to think about how they can use the newly gained knowledge on occupational pesticide exposure & health and make plans for implementation in practice.

You can organize the assignment as following:


- Divide to participants in small groups.
- Let the participants work together in these small groups to discuss and come up with ideas for implementation of the information they got from this training in practice.
- Present some questions or an assignment for the participants to work on; an example of such an assignment is given in **Slide 81**.
- Give the participants enough time to work on the assignment.
- Give each group a flipchart, some coloured paper cards and some markers in different colours.
- Instruct the participants to summarize their ideas on the flipchart (writing, drawing, sticking coloured paper cards) and to be creative.
- Let each group present and share their plans and ideas plenary with the group.

Assignment



Discuss

- What are the main pests or diseases at the moment
- Which pesticide do you use to control it?
- What would be a less hazardous choice or alternative option for controls without using pesticides or with using less pesticides?
- What can you do yourself to reduce the exposure to pesticides and protect yourself, your family and the community?
- What are you going to do different now you have completed this training on Occupational Pesticide Exposure & Health?

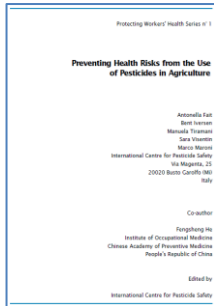

Assignment

Slide 81

2.11 Further Resources

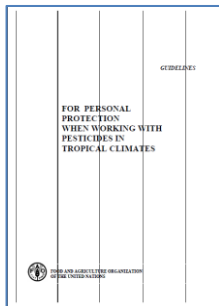
Safety and Health Guides

The following publications are examples of other safety and health guides for the use of pesticides:



Preventing Health Risks from the Use of Pesticides in Agriculture
World Health Organization
2001

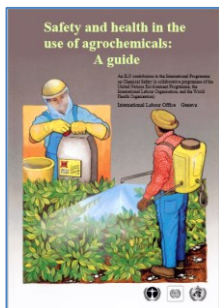
http://www.who.int/occupational_health/publications/en/oehpesticides.pdf



Guidelines for Personal Protection when Working with Pesticides in Tropical Climates

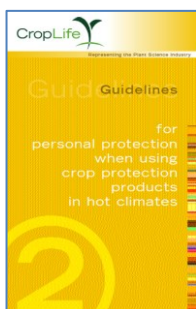
Food and Agriculture Organization of the United Nations
1990

http://www.fao.org/fileadmin/templates/agphome/documents/Pests_Pesticides/Code/Old_guidelines/PROTECT.pdf



Safety and Health in the Use of Agrochemicals: A Guide
International Labour Organization
1991

http://www.ilo.org/wcmsp5/groups/public/@ed_protect/@protrav/@safework/documents/instructionalmaterial/wcms_110196.pdf

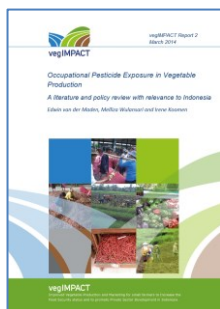


Guidelines for Personal Protection when Using Crop Protection Products in Hot Climates

CropLife
2004

<https://croplife.org/wp-content/uploads/2014/04/Guidelines-for-personal-protection-when-using-crop-protection-products-in-hot-climates.pdf>

vegIMPACT WP Occupational Health publications



Occupational Pesticide Exposure in Vegetable Production A literature and policy review with relevance to Indonesia

vegIMPACT
2014

<http://vegimpact.com/attachments/article/78/vegIMPACT%20Report%202%20Occupational%20pesticide%20exposure.pdf>

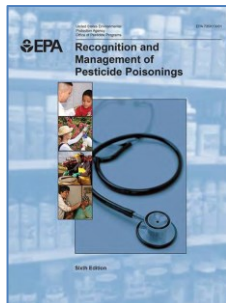


Baseline survey of occupational pesticide exposure in Kersana sub-district, Brebes, Indonesia

vegIMPACT
2014

http://vegimpact.com/attachments/article/78/vegIMPACT%20Report%203%20WP%20Occupational%20HEALTH_final.pdf

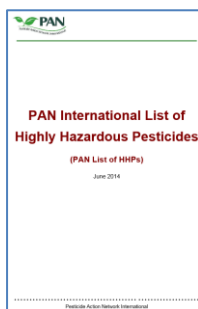
Other Interesting Publications



Recognition and Management of Pesticide Poisoning

United States Environmental Protection Agency
2013

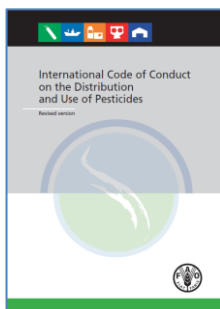
http://www2.epa.gov/sites/production/files/2015-01/documents/rmpp_6thed_final_lowresopt.pdf



PAN International List of Highly Hazardous Pesticides

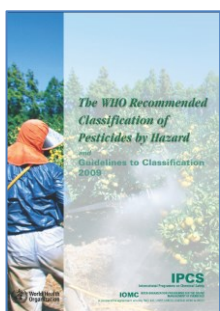
Pesticide Action Network International
2014

http://www.panna.org/sites/default/files/PAN_HHP_List_2014.pdf



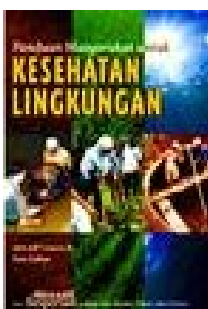
International Code of Conduct on the Distribution and Use of Pesticides
Food and Agriculture Organization of the United Nations
2005

<http://www.fao.org/docrep/018/a0220e/a0220e00.pdf>



The WHO Recommended Classification of Pesticides by Hazard
World Health Organization
2009

http://www.who.int/ipcs/publications/pesticides_hazard_2009.pdf?ua=1



A Community Guide to Environmental Health (Bahasa)
Hesperian Foundation
2008

<http://hesperian.org/books-and-resources/resources-in-indonesian>

Section 14: Pesticide is a poison (Bahasa)

http://hesperian.org/wp-content/uploads/pdf/id_cgeh_2010/id_cgeh_2010_14.pdf

3 Adult Learning and Participatory Training

In the former chapter we have given you information about the content of the training modules on Occupational Health – the “what”. Now we will look at the learning process – “how” you will deliver the content, and give an inspiring training with impact. With this chapter we aim to improve your understanding of learning principles and adult education, your knowledge how to design a training, understand the experiential learning cycle and different learning styles, use different interactive methods and get some ideas on how to improve your micro skills in facilitation. We also hope to convince you about the importance of an interactive training approach attuned to your participants. We end this chapter with some more general tips, summarizing notes and suggestions for further reading.

3.1 Adult Learning Principles

In this section we will explain about what we mean by learning, adult learning, the experiential learning cycle, the role of the facilitator, the conscious competence model, and about the three dimensions you need to cover in your training: knowledge skills and attitude.

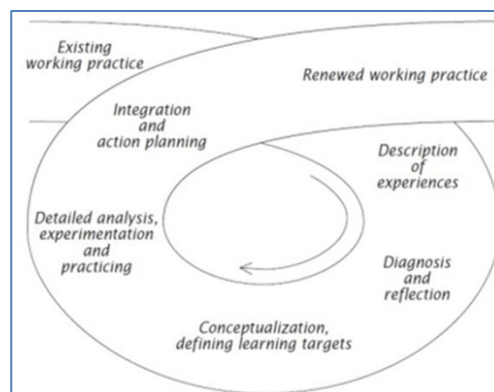
Learning is a very central element in a training. We see learning as “the accumulation of knowledge & skills and the ability to constantly improve the effectiveness of action”. So it involves applying lessons learned into future actions, which provides the basis for another cycle of learning. Continually improving the quality of your work by looking at past successes and mistakes and finding out how to increase success and minimise failure in the future. In this context: learning to reduce occupational pesticide exposure and health risks.

In the context of this project, vegIMPACT you are going to **train adults**, mostly farmers and (female) agricultural labourers (or similar professionals) who are involved in vegetable production in Indonesia. You are training them on pesticide hazards and safe pesticide use, with the aim to reduce occupational health risks and pesticide hazards and exposure.

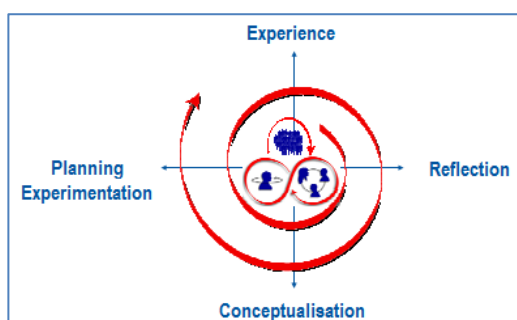
It is important to realise that **adult learners** are not empty vessels, they have gained a lot of experience throughout their life and in their working practice, also when it comes to handling pesticides. Adults like to receive new information but they also like to share their own experiences. They have developed self-knowledge and need self-motivation to change. Sharing ideas with each other, being open about problems and failures and seeing them as an opportunity for learning to do a better job in pesticide use, are important elements in this training. Furthermore adults learn mostly from peers if they consider an issue or topic relevant to their lives/jobs. So drawing in the experience of your participants, asking for their questions or issues around pesticide use and combining that with the information from these modules will help you to give a training in such a way that your participants become better at what they are doing: growing vegetables **and** safe use of pesticides. In this way you try to ensure real impact.

A **cyclic model** that can help to understand the learning process of adults is presented here and exists of the following elements:

- Existing work practice: a lot of spaying and unsafe handling of chemicals.
- Description of experience: this is how we always do it: e.g. no protective cloth, high dose, etc.
- Diagnosis and reflection: where do things work well and where not?
- Conceptualisation and defining learning targets: this is where you come with these modules on pesticides: new information, new concepts, e.g. chemicals are dangerous for health of humans, and there are other, more safe ways of using them.
- Experimentation and practicing: how can we change our current farming practice? Making a (new) plan, looking at examples how it can work, trying it out.
- Action planning: very practical work plan.
- Renewed working practice: better techniques and safe pesticide use!



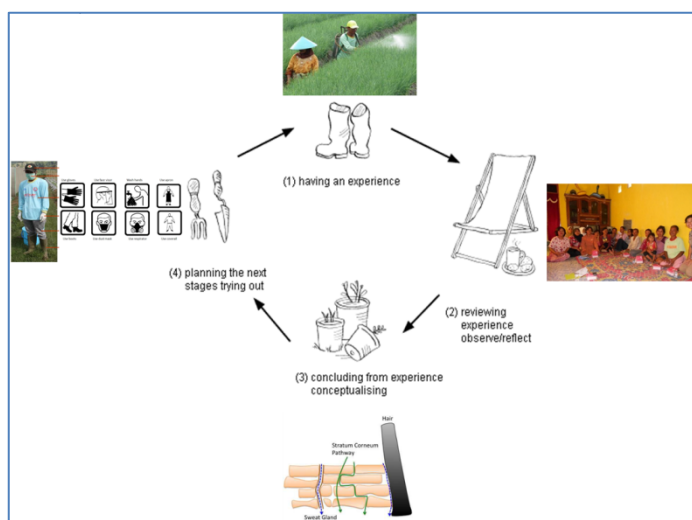
So during your training you take the participants basically through this ‘cycle of learning’.



This cycle of learning is based on the **experiential learning cycle** developed by Kolb¹. He believes that “learning is the process whereby knowledge is created through the transformation of experience”. In this learning cycle four stages are distinguished: 1) concrete experience (“DO”), 2) reflective observation and analysis - zooming-in (“REFLECT”), 3) abstract conceptualization - zooming-out (“THINK”), and 4)

active experimentation (“PLAN”). One may start the process at any stage, but must then follow the cycle in the sequence.

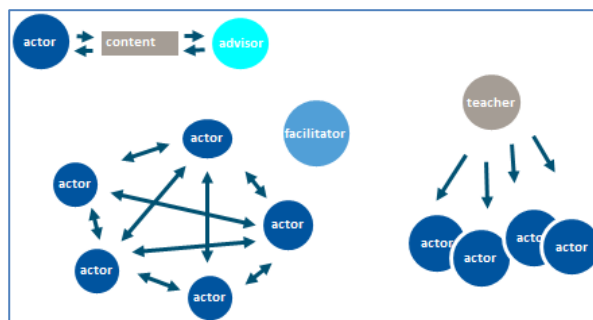
So again translating it to this training and the context of vegIMPACT: 1) participants come in with their experience ‘from the field’. 2) in the training you take moments to sit down, reflect and analyse their current practice. 3) you also provide information and new ideas and concepts, for example about how the chemicals inter through the skin. 4) with the new knowledge and ideas the farmers can make a plan to experiment with a new practice.



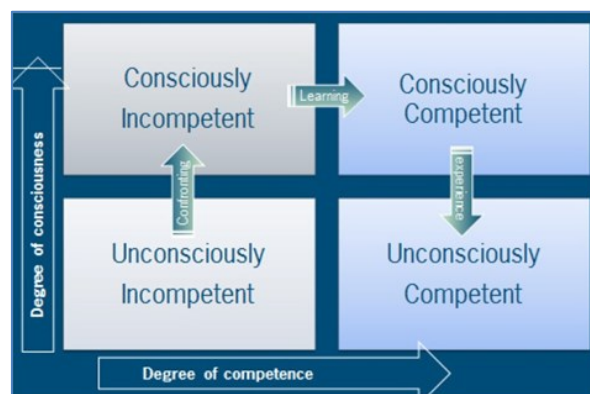
1) The American educational theorist David A. Kolb (1984) builds upon earlier work from John Dewey on reflective thought & action and Kurt Lewin on action research

And then they apply this in the field, they have a new experience (1). Most likely they will reflect (2) on this new experience in terms of crop performance and health issues, they might again look for new information (3) to inform and improve their practice, make an even better plan (4) and again have an experience (1) in the field – another cycle of learning is completed. You can start from any of the four phases in the cycle, it does not have to start from experience! But it is important when you give a training to cover all 4 aspects of this cycle and not get stuck in only one phase, e.g. ‘dumping’ a lot of new information on your participants.

The **role of the facilitator / trainer** differs from a traditional teacher’s role. You might be used to a more formal teaching role, giving a lecture in front of the group, or being an advisor and talking to farmers individually, giving them the ‘expert knowledge’. But now we invite you to also take a facilitating role where you ask people to share, to interact, and where you enable that learning can take place. We are not saying the one role is better than the other, but they just serve different purposes, and within this training context you may want to alternate between all three roles.



Another way of looking at learning is by using the **conscious competence** model. Because people don’t know what they don’t know. So you start from a place where you are ‘unconsciously incompetent’, or in other words you don’t know that you are not competent – in this context farmers might not know that they do unsafe pesticide use, they don’t know that they are ‘incompetent’. Through confrontation or exposure they move to a place where they are ‘consciously incompetent’ – farmers realise that they do unsafe pesticide use with bad implication for their health and the environment. Through learning they become consciously competent: they become aware that they are competent and are able to do safe pesticide use but they might have to concentrate since it is a new practice. But through experience they become ‘unconsciously competent’, they forget that they are competent now – it has become so normal that they don’t think about it anymore. Of course you do safe pesticide use!



As trainer it is important to know how you can support your participants through this process: the first transition from ‘unconsciously incompetent’ towards ‘consciously competent’ is about awareness raising through confrontation or exposure (e.g. you can do this with the shocking pictures of skin injuries caused by the pesticide paraquat). Then the next transition to become ‘consciously competent’ is done through learning so by giving this training and providing the participants with new information, tools and techniques they can develop new competences – new farming practices and safe pesticide handling. And the last transition will take place through practice



and developing new routines – mainly to be done by the farmers and labourers themselves but you might do some monitoring.

Lastly we aim to cover three aspects of participants' capacity: knowledge, skills and attitude.

1. Knowledge – knowing (e.g. what do the labels mean)
2. Skills – being able to do (e.g. use the protective gear in the right manner)
3. Attitude – mind-set (e.g. having the motivation to do safe measures)

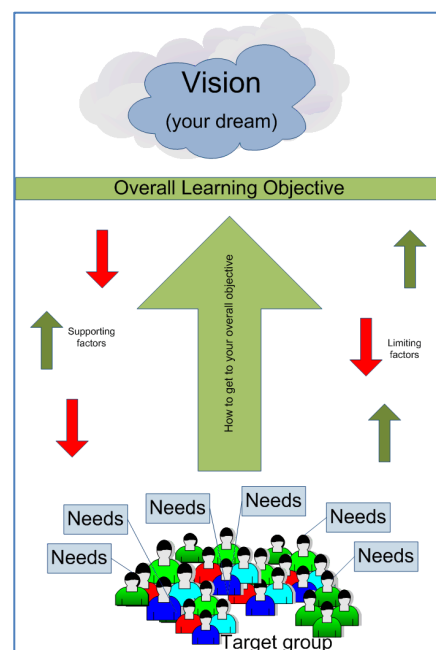
So this training is not only about transferring information to increase the knowledge of the participants on occupational health. It is also about developing new skills to change their practice so this means that they get the chance during this training to do exercises where they practice those new skills, or that you provide them with very practical ideas on how to do things (e.g. being able to use protective clothing, or being able to apply a certain new spraying technique). **And** it is about a change in attitude and this last one may be the most difficult one. Are the farmers and labourers going to change their way of working with pesticides? Without them changing their behaviour, there will not be the impact we aim for. So what do they need in order to change their attitude, their mind-set? What can you do in the training to make sure that farmers become more critical, more motivated, more curious, or more careful? Elements that can help to work with the attitude of your participants include having discussion or debates with them, using convincing arguments, exposure to new information and facts, exercises to discover and explore the danger of the pesticide, etc.

3.2 Training Design

When you design a (new) training, it is important to first think about the desired end result: what for? Why a training? We call this 'Backward Design' because you start thinking about the desired end results & learning objectives, the desired impact or in other words your vision for the future, and only then you think 'backward' and ask yourself: So what should happen to get there, to your overall objective and vision? You plan the learning experiences and instructions with the end result in mind.

In this case: vegIMPACT is a program aimed at improving vegetable production and marketing for small farmers in Indonesia. The activities of the vegIMPACT program are organized in six Work Packages. The work package Occupational Health implements several activities to reduce occupational health risks and pesticide hazards and exposure. Training farmers and female agricultural labourers on pesticide hazards and safe pesticide use, is one of the strategies to achieve those objectives.

So the vision (or future dream) of this training is that farmers are protecting themselves, their family and the environment from risks of being exposed to pesticides – let's say: 'good agricultural practice and safe pesticide use'. And the overall learning objective is:



- Farmers know about safe pesticide use;
- They are able to implements new (safe) ways of working;
- They are willing/motivated to improve their farming practice and pesticide use.

After the vision you look at the current situation (present): where are the farmers and labourers now, what is their current practice, what are their problems and what do they need to learn?

And then you look at the training: what should happen in this training to get to our future dream, to have the desired impact? What learning experiences and instructions will enable participants to achieve the desired learning objectives and results? How can you hook the participants in the beginning and hold their attention? How can you equip participants with the necessary experiences, knowledge, tools and know how? And how can you organize feedback on the performance of the participants, and how do we monitor and evaluate the training outcomes?

Having these questions in mind can help you to effectively use the modules that were already designed but which you may want to adapt to your own situation and understanding.

Then two more thoughts: on starting a training, and on ending a training.

In the beginning of this manual we already wrote something on how to start and on building trust. The start of a training is very important: in the beginning you set the tone – so make sure you create the right energy! You can do this in your own way but think about it carefully, because it may influence the quality of the rest of the training. Other suggestions on what else you can do at the start of this training:

- Connecting and getting to know each other (introduction games)
- Introduce the context and objective (s) of the training
- The specific learning goals
- The programme and timing
- Optional: Learning principles / way of working and a learning contract / ground rules

Towards the end of the training it is important to give some time for participants to think about what they will do with what they learned during your training. Because: “If you keep on doing what you always did, you will get what you always got”. Will the farmers and labourers go back to their normal routines? Or will you give them some time at the end of the training to make an action plan. Developing an action plan is not a guarantee that people will change their practice but it may increase the likelihood. And making the action plan ‘SMART’ can also help:

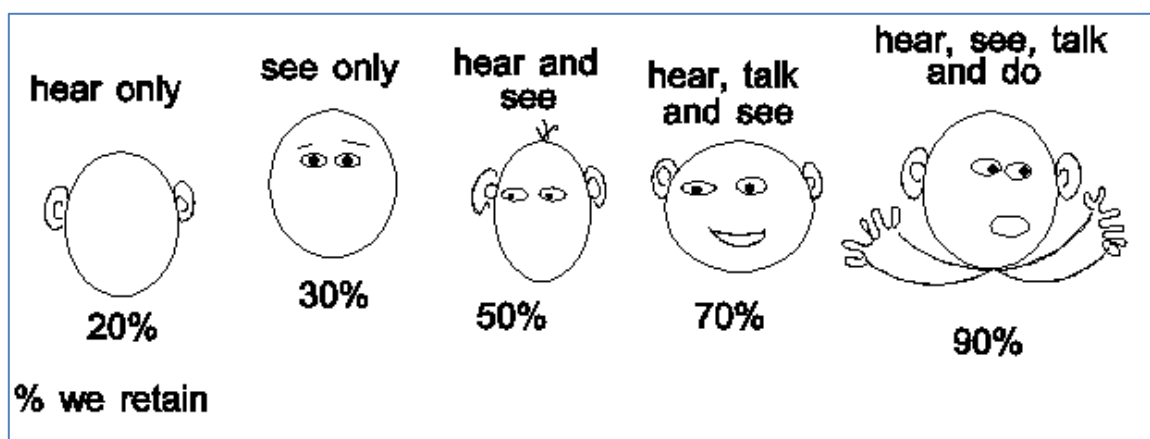
- **Specific** – what are you going to do (differently)?
- **Measurable** – How do you know something changed?
- **Acceptable** – Will other people support your actions?
- **Realistic** - is it doable? Not too ambitious?
- **Time** – when will you do it?

Another (quicker) way of closing a training and thinking about next steps is by using the ‘talking stick’: A talking stick is passed from one person to the next, around the circle and only the person with the talking stick can talk, the others listen. You can ask the group for example: Please share in one sentence: ‘your feeling at the end of this workshop’ or: ‘the most important thing (lesson learned) you take home from this workshop’ or: one concrete step you will take after this training’, and then give the talking stick to the first person.

3.3 Participatory Training Methods

We will introduce 6 different elements to take into consideration when choosing methods for your training: interactivity, learning styles, aims and objectives, knowledge skills attitude, practical issues, and own personal preference as trainer.

So to start with: why would you work in an interactive, participatory manner? We partly answered this question in the section on adult learning: adults like to be involved and share their own experience. Furthermore we believe it will increase the impact of your training if you work in a participatory, interactive manner. From various research sources we know that we remember from: the Lecture (5%); Reading (10%); Audio Visual (20%); Demonstration (30%); Discussion group (50%); Practice by doing (75%) and Teaching others (90%).



And like Confucius was already stating long time ago (450BC):

- Tell me and I'll forget.
- Show me and I may remember.
- Involve me and I will understand.

In this training manual there are different questions in each module to stimulate the interaction with your participants. However, alternatively the questions might also be replaced by some interactive assignments where you really involve the participants and where they can practice by doing.

Furthermore your participants may have different **learning**

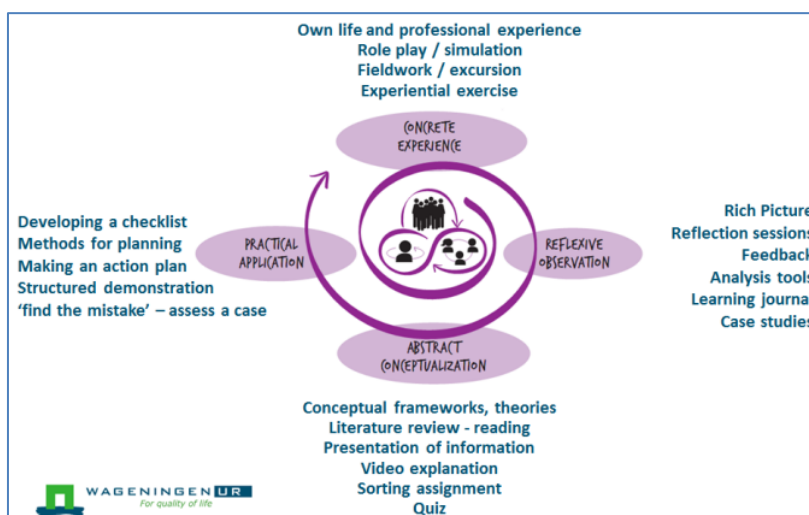


styles. Some people learn best by doing, others prefer to reflect and observe, some people like to study books and others just want something useful. So there are four different learning styles¹, and this is linked to the experiential learning cycle of Kolb which we mentioned before.

- **ACTIVIST:** learning from concrete experiences; ‘I’ll try anything once’. But they may be impatient in your training.
- **REFLECTOR:** learning from reflective observation; ‘I need time to think about it’. But they may be slow to respond in your training.
- **THEORIST:** learning from abstract conceptualisation; ‘If it’s logical it’s good’. But they may be critical to adopt new ideas in your training.
- **PRAGMATIST:** learning from active experimentation; ‘If it works, it’s good’. But they may show little emotional involvement in your training, they just want solution.

Farmers and labourers might be more activist and pragmatist type of people, but you don’t know for sure, so be open!

The important message here is that you try to cater for different needs, so use different type of methods. In the picture presented here you recognise the learning cycle of Kolb but in



each phase we now included some methods related to that phase, and related to the learning styles. So in your training you can choose a mixture of these methods covering all four domains.

Then it is also important to choose appropriate methods in service of the **aims, objectives** and subject matter of your training. Various methods can also be adapted to your specific training content, so for example a group work assignment or rich picture or stakeholder analysis tool can be tailored to the pesticide issues you want to address.

Also methods need to cover the three aspects of learning which we mentioned before: **knowledge, skills and attitude**. To highlight a few example methods for each aspect:

- **Knowing & understanding:** lectures, group discussions, case studies, literature.
- **Skill development:** demonstration, practical exercises, videos.

¹ Developed by: P. Honey and A. Mumford, based on the work of Kolb

- Attitude and mind-set: discussions, exposure, new experiences, questioning experience!

Additionally the more practical things like **availability of facilities, time and budget** define or constrain which methods can be used. Time may be a limiting factor so you might have to compromise on the diversity of methods or look for 'quick' alternatives. Instead of a field excursion you may want to use a short video to demonstrate a new technique, or the use of protective clothing. Or when time is lacking you may skip a group assignment and instead have a brief discussion on the topic by posing a question at the end of each module. If there is budget available, then you could develop a specific new tool for this training (e.g. video clips).

And lastly the training methods have to match with your own skills, experience and preference. Choose the methods you feel comfortable with and where you can use your own qualities. For example, if you are very knowledgeable on pesticides, you may choose to give an extensive lecture and use many examples from your own experience, but if you are less knowledgeable on pesticides, you may provide more examples from literature and use more interactive methods to draw in the experience from your participants and stimulate the sharing of knowledge.

3.4 Facilitation Principles, General Skills and Micro-skills

Facilitation comes from the French word 'facile', which means 'easy'; to make easy, to enable, to help members of a group to conduct a meeting or learning event in an efficient and effective way. So in its broadest sense, facilitation is about creating and holding the space in which interaction and learning can take place. It is a distinctive role which demands particular skills and attributes of those involved in performing it, like the capacity to enhance relationships (joint activities), enhance interaction (stimulating, safe atmosphere, creating trust), encourage, balance and structure communication, improve learning, enhance mutual understanding (underlying values and identity) and shared commitment, sometimes conflict management and transformative mediation, management of the process including time, breaks, energy, creativity, enhance capacity building and coordination for execution, enhance ownership, self-monitoring & open communication. It is different from the role of teacher or advisor, although when facilitating a learning event (this training) one might also sometimes take those other roles and alternate between them.

Some **essential skills** of a facilitator / adult educator include:

1. **Listening:** the first skill needed is the ability to listen carefully; picking out both positive aspects and problems, difficulties, tensions, and needs. We often make judgments more than we try to understand: Imagine how much better communications would be if listeners tried to understand first, before they tried to evaluate what someone is saying. So listen to learn, and learn to listen. "We have two ears and one mouth so that we can listen twice as much as we speak."
2. **Observation:** going closely with listening is observation; the ability to pick up information and feelings about the situation (the feelings from non-verbal cues).
3. **Empathy, sensitivity:** to be able to see problems as seen through the eyes of the participants, to be able to detect and understand their feelings, ideas, values.
4. **Encouragement:** building confidence in the participant by affirming the positive aspects of the work done/behaviour performed, showing appreciation for time and commitment given and by

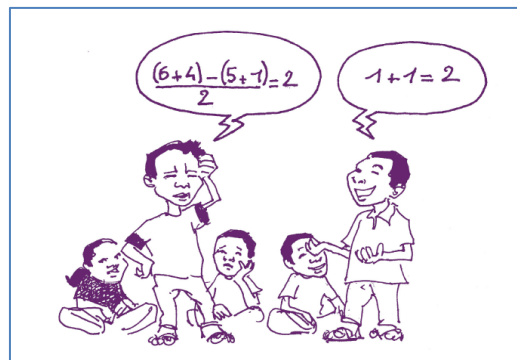
helping them to recognize their learning objectives, thinking out alternative ways of doing things.

5. **Helpful questioning:** sympathetic questioning that enables the participants to understand the causes of problems, to think through the consequences of certain types of actions, etc.
6. **Summarizing/structuring:** to be able to summarize information generated by the participants and picking out main problems, sorting out main possibilities and developing concepts and simple models together with the participants.
7. **Timing:** a sense of timing when to encourage, when to challenge, when to ask questions, when to give suggestions, when to give support, when to summarize, and when to give a break, etc.
8. **Flexibility/planning:** to be able to create an atmosphere of flexibility, creativity and experimentation, and to act upon it oneself, (in combination with a good preparation), insight in how to develop the learning process, how to use time efficiently, how to organize learning situations in a good sequence without losing focus.
9. **Openness/self-reflection:** to be open to feedback from the participants about the way we work and to take time to examine our own attitudes, values and ideas.
10. **Managing group dynamics:** to be aware of the different phases of group development, and to be able to make effective interventions.
11. **Giving honest feedback:** being mindful when observing participants and having the capacities and courage to give them both positive and constructive feedback.
12. **Dealing with resistance:** Being aware of the resistance, where it comes from and work with it! This means you don't always give in but understand the needs and take a wise decision.
13. **Practice what you preach:** facilitators are often seen as a role model inspiring their participants by their way of working.
14. **Clear instructions for assignment:** being very clear in your explanation about the goal of the assignment, the procedure, the time and the output you expect. And do not give too many instructions at once.
15. **Facilitating the debriefing:** being able to debrief after an activity and facilitate through the different phases of the learning cycle of Kolb, asking carefully selected reflection questions.

Going into more detail we will describe four useful **micro-skills**:

A) Paraphrasing (making clear what somebody in the group is expressing):

- Use your own words to say what you think the speaker said
- If the statement is long, summarize it
- From the negative 'them', to the positive 'us'
- When completed, look for the speakers reaction
- "It sounds like what you are saying....."
- "So what you are saying is...."



- “You said nobody takes responsibility. So you wish that everybody is motivated?”

B) Gathering ideas & encouraging

- Describe the issue at hand precisely
- Ask participants to suspend judgment, and
- Shortly name important issues
- Reward people for their active participation
- “Who else has an idea?”
- “A lot of men have been talking, let’s hear from some women”
- “Let’s hear from someone who hasn’t spoken for a while”
- Ask the participants to “buzzzz” before answering
- “Can you say more about that?”

C) Balancing

- The direction of a discussion often follows the lead set by the first few people who speak
- Silence does not necessarily mean consent
- Facilitator should try to balance this and offer assistance for other opinions
- “Okay, now we know the opinions/ideas of three people, does anyone else have different opinions/ideas?”
- “Does everyone else agree with this?”
- “Are there other ways of looking at this?”
- “So, we have heard x and y point of view, is there a third way of looking at this?”

D) Intentional silence

- A short pause of a few seconds
- It gives people time to think and reflect on what has said
- Five seconds of silence can seem longer than it really is.
- Stay focused on the speaker with eye contact and body language.
- Just stay relaxed and pay attention
- “Let’s take a minute of silence to think what this means to each of us.”

Of course there are many different styles in facilitation and it is important to develop your own personal style. In the end facilitation is a balancing act!

3.5 Final Tips and Suggestions

Generally speaking we can say that learning is helped by:

- Creativity and interaction: opening up to new ways of learning, different from ‘school’
- Critical reflection and linking to own experiences of your participants
- A learning environment: positive feedback, addressing people’s background needs, participation, listening, etc.
- Cultural appropriateness
- Improving access to education, information, infrastructure, the right equipment, etc.

But on the other hand there are some barriers to learning:

- The difficulty of unlearning. Sometimes people are stuck in their old habits, or believe in old tradition (this is how my grandfather also did it...)
- Norms, privileges and taboos, e.g. “it’s different for us”, “in Europe there are different rules and standards”, “we never talk about our health problems”
- Information disorders, e.g. structural information disorders (info blocked or distorted because of hierarchy, specialisation or centralisation). Do the farmers get the same information about the dangers of pesticides from the salesman?
- Power differences, e.g. my boss told me to do it in such way, or I believe what the chief is saying is right.

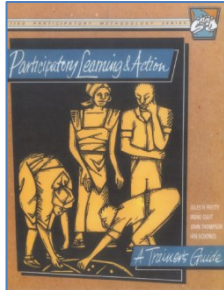
So summarizing the key ideas for creating a fruitful learning environment:

- Adults like to receive new information but they also like to share their own experiences – make learning lively and interactive
- Alternate between the three roles of teacher, advisor and facilitator
- Cover three aspects of participants’ capacity: knowledge, skills and attitude
- Think about the overall learning objective and vision when you design a training
- Make use of all phases of the experiential learning cycle
- Cater for different learning styles – diversity of methods
- Analyse the participants’ learning culture and needs
- Make a habit of critical reflection
- Note and address barriers to learning
- Have fun!

3.6 Further Resources

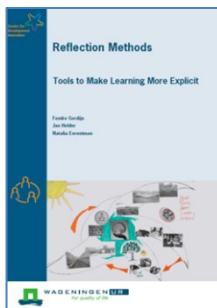
Booklets

The following booklets are useful resources to learn more about training and facilitation:



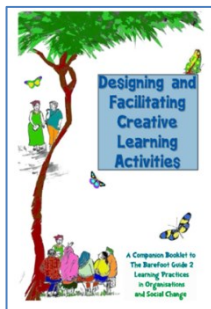
Participatory Learning and Action: A trainer's guide

<http://pubs.iied.org/6021IIED.html?k=trainers%20guide>



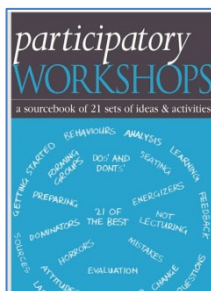
Reflection Methods Tools to Make Learning More Explicit

<http://edepot.wur.nl/222693>



Designing and Facilitating Creative Learning Activities

http://www.barefootguide.org/uploads/1/1/1/6/111664/barefoot_guide_2_learning_companion_booklet.pdf

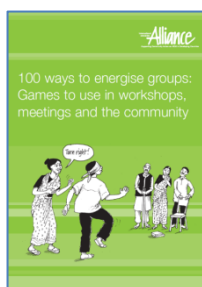


Participatory Workshops: A Sourcebook of 21 Sets of Ideas and Activities

<http://www.amazon.com/Participatory-Workshops-Sourcebook-Ideas-Activities/dp/1853838632>

100 ways to energise groups: Games to use in workshops, meetings and the community

http://www.icaso.org/vaccines_toolkit/subpages/files/English/energiser_guide_eng.pdf



Some interesting websites

Capacity.org: www.capacity.org

Capacity.org is a resource portal for the practice of capacity development and the home of Capacity.org journal, published two to three times a year. Building on the topics covered in the journal, this website aims to facilitate access to a broad range of related online resources that practitioners can draw on for their own work. Links to ongoing discussions and communities of practice are offered as well.

CDI MSP Portal: <http://www.wageningenportals.nl/msp>

This portal is part of a platform from the Centre for Development Innovation, part of Wageningen University and Research Centre. The purpose of the platform is to enable practitioners to collaborate and share knowledge, experiences and strategies on Multi-Stakeholder Processes. There are a lot of tips and tools available.

CDRA: <http://www.cdra.org.za>

The Community Development Resource Association (CDRA) is a civil society organisation, established in 1987, based in Cape Town, South Africa. CDRA is a centre for organisational innovation and developmental practice. It fosters and promotes innovative organisational forms and practices that seek to transform power towards a just world characterised by freedom, inclusion and sufficiency.

FAO Capacity Development Learning Modules: <http://www.fao.org/capacitydevelopment/en>

Capacity Development is at the heart of FAO's mandate. The Capacity Development Portal contributes to FAO's vision of strengthening the national capacities of its Member Countries to achieve their own goals in the areas of food security and agricultural development. Through its learning resources and learning services, the Portal addresses the needs of individuals in rural communities, in organizations and institutions, and at policy level.

Salto Toolbox for learning: <https://www.salto-youth.net/tools/toolbox>

This toolbox is created to help you find and share useful training Tools, the Toolbox for training is an online catalogue you can browse through freely or even contribute to!

Tools and Tips for Trainers: <http://www.nfsmi.org/ResourceOverview.aspx?ID=369>