

PROTECTION OF OTHERS

**A. APPLICATORS, SUPERVISORS, SANITARIANS, AND
AGRICULTURAL EXTENSION OFFICERS:**

Subject A: Should know the importance of protecting other people, and methods for the transportation and storage of pesticides. May need to understand the need for exclusion areas in crops.

Subject B: Should know the importance of protection of the environment, methods of safe disposal of wash water, used containers, and unwanted pesticide. May need to understand ways of decontaminating containers.

B. OTHER HEALTH AND MEDICAL PERSONNEL:

Subject A: Should know that other people in the community need protection from mishandling of pesticides.

Subject B: Should know the importance of environmental protection.

C. REGISTRATION PERSONNEL:

Both subjects: As in B above. May need to understand the methods used.

NOTE TO TRAINER:

New modules on national requirements for the transportation and the storage of pesticides, and for the protection of water sources may need to be introduced into this section.

Section: IV Protection of others
Subject: A Other people
Number: 1 Introduction

Main point:

People and animals may be poisoned, and plants damaged by misuse of pesticides and by failure to take proper precautions for their handling and custody. More people who do not handle pesticides in their work are poisoned through avoidable mishaps than workers handling the pesticides.

**EVERYONE WHO HANDLES PESTICIDES HAS A DUTY TO ENSURE THAT NO
OTHER PERSON OR ANIMAL IS AFFECTED BY THE PESTICIDES,
AND THAT ADVERSE ENVIRONMENTAL EFFECTS ARE AVOIDED AS FAR AS
POSSIBLE.**

Examples: large outbreaks of poisoning have been caused by the accidental contamination of food with pesticides, usually during transportation. The foods concerned are usually flour, rice, and sugar, as these are carried in sacks.

Children have been affected when they have played with discarded containers, and others have been poisoned using pesticide from unlabelled containers, thinking that it was another product.

Subsidiary point:

It has to be remembered that while workers with pesticides are adults, and are usually healthy, the community consists also of the very young, the very old, and the sick. All these groups are more likely to be affected by doses of pesticide that would have no effect on the healthy adult worker. It is also important that exposure of pregnant women to any toxic chemical should be avoided as far as possible.

For discussion:

Have pesticides adversely affected animals or the environment here?

Other information:

If the above discussion takes place, it has to be borne in mind that pesticides are sometimes blamed for causing effects which are coincident with pesticide application but are not otherwise connected with it. Some mishap leading to **SIGNIFICANT** exposure should be established before a causative relationship can be accepted.

Suggested visual aid: Text with the words in capital letters above.

Section: IV Protection of others
Subject: A Other people
Number: 2 Transport by truck

Main points:

**CONTAINERS OF PESTICIDE SHOULD NEVER BE CARRIED
IN THE SAME TRUCK AS FOOD OR ANIMAL FEED.**

**IF THE CONTAINER SHOULD LEAK, THE FOOD CAN BE CONTAMINATED
BY THE PESTICIDE.**

**LIQUID FORMULATIONS ARE MORE HAZARDOUS IF THEY LEAK
AS FOODSTUFFS MAY ABSORB THE LIQUID,
AND THE PESTICIDE MAY PASS DEEPLY INTO THE FOODSTUFF.**

THE FOOD MAY NOT SHOW THAT IT HAS BEEN CONTAMINATED.

Subsidiary points:

1. Trucks may carry different goods on different days. Even if pesticide has been carried correctly without any food in the truck on one day, the vehicle may carry food on the following day. Whenever pesticides are carried, the deck of the truck should always be examined after unloading for any evidence of leakage. If a container might have leaked, the deck must be decontaminated immediately.
2. Decontamination is carried out by scrubbing the deck with water. Use sawdust, newspapers or old cloth to absorb the water, and dispose of these in the same way as empty containers, by burning or burying. Feet and hand protection must be used during decontamination.

Other information:

For disposal methods, see modules IV B 4 and 5.

Suggested visual aid: Photograph of truck with drums of pesticide on back.

Section: IV Protection of others
Subject: A Other people
Number: 3 Transport by boat

Main points:

**CONTAINERS OF PESTICIDE SHOULD NEVER BE CARRIED
IN THE SAME BOAT OR COMPARTMENT OF A BOAT AS FOOD OR ANIMAL FEED.**

**IF THE CONTAINER SHOULD LEAK, THE FOOD CAN BE CONTAMINATED
BY THE PESTICIDE.**

**LIQUID FORMULATIONS ARE MORE HAZARDOUS IF THEY LEAK
AS FOODSTUFFS MAY ABSORB THE LIQUID,
AND THE PESTICIDE MAY PASS DEEPLY INTO THE FOODSTUFF.**

THE FOOD MAY NOT SHOW THAT IT HAS BEEN CONTAMINATED.

Subsidiary points:

1. Boats or compartments of boats may be loaded with different goods on different days. Even if pesticide has been carried correctly without any food in a compartment, food may be loaded into that compartment on the following day. Whenever pesticides are carried, the deck beneath it should always be examined after unloading for any evidence of leakage. If a container might have leaked, the deck must be decontaminated immediately.
2. If the boat has more than one deck, pesticide should never be carried in a compartment above another containing food. If leakage occurs, all compartments below should also be examined for contamination.
3. Decontamination is carried out by scrubbing the deck with water. Use sawdust, newspapers or old cloth to absorb the water, and dispose of these in the same way as empty containers, by burning or burying. Feet and hand protection must be used during decontamination.

Other information:

For disposal methods, see modules IV B 4 and 5.

Suggested visual aid: Photograph of drums of pesticide being loaded on to a boat.

Section: IV Protection of others
Subject: A Other people
Number: 4 Storage of pesticides

Main points:

LARGE QUANTITIES OF PESTICIDES MUST BE STORED IN A SECURE WAREHOUSE, IN THEIR OWN WELL-VENTILATED ROOM OR COMPARTMENT.

THE AREA IN WHICH THEY ARE STORED SHOULD BE MARKED WITH 'DANGER', 'NO ENTRY', AND 'NO SMOKING' SIGNS. DRUMS SHOULD BE PLACED SO THAT THEIR LABELS ARE CLEARLY VISIBLE, BUT SHOULD NOT BE STACKED MORE THAN TWO HIGH IF BEING HANDLED MANUALLY.

LEAKING DRUMS MUST BE PUT INTO A SEPARATE AREA ON A BED OF SAWDUST OR OTHER ABSORBENT MATERIAL UNTIL THEIR CONTENTS CAN BE USED OR TRANSFERRED TO A SOUND EMPTY DRUM WHICH HAS HELD THE SAME PESTICIDE.

ALL DRUMS OR PACKAGES SHOULD BE CLEARLY MARKED WITH THE DATE RECEIVED INTO STORE SO THAT THEY CAN BE USED IN STRICT ROTATION.

DRUMS IN STORE MORE THAN TWO YEARS SHOULD NOT BE USED UNTIL THEIR CONTENTS HAVE BEEN TESTED FOR QUALITY.

Subsidiary points:

1. Contaminated sawdust or other absorbent material should be disposed of in the same way as empty containers.
2. Floors of pesticide warehouses should never be dry swept. Damp sawdust or industrial vacuum cleaners should be used.
3. Clean water should be available for those working in the warehouse to wash. All workers should wear correct personal protection.

For discussion:

What is correct personal protection for a warehouseman?

Other information:

1. The minimum protection is for body, feet, and hands.
2. For disposal of empty containers, see subject B of this section.

Suggested visual aid: Photograph of a well-ordered pesticide storage area.

Section: IV Protection of others
Subject: A Other people
Number: 5 Locking up

Main points:

**ALL PESTICIDE STORAGE AREAS MUST BE SECURELY FENCED
TO PREVENT UNAUTHORIZED ACCESS.**

ALL DOORS AND GATES SHOULD BE EFFICIENTLY LOCKED OR PADLOCKED.

**IN CASE OF FIRE, THE ADDRESS OF THE PERSON(S) HOLDING THE KEYS
SHOULD BE FIXED TO THE GATE OR DOOR.**

Subsidiary points:

1. The person(s) holding the keys should be aware of the types of pesticides held in the store, in order to assist firemen or police in the event of fire or break-in. The best way in which this might be achieved is for the same person(s) to be responsible also for keeping the register of pesticides currently in the storage area.
2. On farms, pesticide stocks should be locked up away from any living quarters and livestock housing or food supplies. Buildings where pesticides are stored should also be well away from any water sources that might be contaminated by spillage.

For discussion:

In the event of fire or break-in, what authorities should be informed, and who should do this?

Suggested visual aid: Photograph of padlocked gate or door.

Section: IV Protection of others
Subject: A Other people
Number: 6 Storing and using household pesticides

Main points:

HOUSEHOLD PESTICIDES SHOULD ONLY BE BOUGHT AS NEEDED.

**UNUSED PESTICIDES SHOULD BE KEPT IN A LOCKED CUPBOARD,
BUT NOT IN THE SAME CUPBOARD AS DRUGS OR MEDICINES.**

**DO NOT USE PESTICIDES IN ANY WAY OTHER THAN
AS DESCRIBED ON THE LABEL.**

TAKE CARE NOT TO CONTAMINATE FOOD IN PREPARATION OR STORED.

**PESTICIDE CONTAINERS IN USE SHOULD BE KEPT
OUT OF THE REACH OF CHILDREN.**

CHILDREN SHOULD NEVER BE ALLOWED TO PLAY WITH EMPTY CONTAINERS.

Subsidiary points:

1. It is especially important to lock up all pesticide concentrates which need dilution before use. These are usually intended to be used for garden pests.
2. No pesticides should be stored except in properly labelled containers. Original packings should be used whenever possible.
3. If a child or adult eats or drinks a pesticide, the person responsible for treatment will need to know the name of the pesticide. Do not destroy the package, but give it to the person concerned.

Suggested visual aid: Photograph of insecticide spray on a high shelf.

Section: IV Protection of others
Subject: A Other people
Number: 7 Exclusion from sprayed crops

Main points:

**AFTER APPLICATION OF PESTICIDES IN AGRICULTURE,
NO UNPROTECTED PERSON SHOULD ENTER A SPRAYED AREA
UNTIL THERE IS NO RISK THAT THEY MIGHT ABSORB PESTICIDE.**

**FOR AREAS DUSTED OR SPRAYED WITH A LIQUID FORMULATION
OF SLIGHT HAZARD, THIS IS UNTIL THE PESTICIDE HAS DRIED ON THE CROP.**

**FOR PESTICIDE FORMULATIONS OF HIGHER HAZARD,
CONSULT THE PRODUCT LABEL,
TO FIND OUT IF THIS PERIOD NEEDS TO BE LENGTHENED.**

FOR DUSTED AREAS CONSULT THE LABEL.

**ALL TREATED AREAS MUST BE CLEARLY MARKED WITH
FLAGS OR OTHER MARKING UNDERSTOOD BY THE LOCAL POPULATION
TO MEAN AN EXCLUSION AREA.**

**ALL SUCH MARKINGS SHOULD BE REMOVED
AS SOON AS THE EXCLUSION PERIOD HAS ENDED.**

Suggested visual aid: Photograph of a sprayed crop with markings understood locally to mean an exclusion area.

Section: IV Protection of others
Subject: B Other organisms: the environment
Number: 1 Results of pesticide contamination

Main points:

**IN THE ENVIRONMENT, PESTICIDES CAN CONTAMINATE
SOIL AND ANIMAL FEED ON THE GROUND, WATER, AND - more rarely - AIR.
THIS CAN RESULT IN THE LOSS OF DOMESTIC ANIMALS AND BIRDS,
FISH, AND BENEFICIAL INSECTS AND THEIR LARVAE.**

**EVERY EFFORT MUST BE MADE TO APPLY PESTICIDES SO THAT
THE LOCAL ENVIRONMENT IS NOT HARMED.**

Examples of practices to be followed:

- clean up major spillages on the ground by digging out the contaminated soil and putting it in bags. Dispose these in the same way as used containers.
- put all the water used for washing protective clothing and equipment in drums, and dispose of it as contaminated wash water. Never wash these items in a river or stream.
- dispose of unwanted pesticide and empty containers in such a way that ground water or run-off into streams will not be contaminated. The methods of doing this will depend on the district.

Subsidiary points:

1. Serious environmental contamination is most likely to occur during mixing, and at the end of the days work. It is important that supervisors should allow sufficient time at the end of the day to allow the mixing site to be cleaned up and for the workers to wash before finishing work. If equipment is taken back to the base for cleaning, it should be treated as a pesticide container during transportation.
2. Adequate disposal facilities for empty containers and unwanted pesticide must be available at the operational base or at some other site approved for the disposal of chemical wastes.

For discussion:

In what other ways may the environment be polluted by pesticides?

Suggested visual aid: Photograph of a worker washing out equipment close to a pit.

Section: IV Protection of others
Subject: B Other organisms: the environment
Number: 2 Disposal of wash water in a pit

Main points:

**IN AREAS WHERE THE GROUND WATER IS NOT HIGH,
WASH WATER CAN BE ALLOWED TO SOAK AWAY IN A PIT
WHICH IS SUBSEQUENTLY REFILLED WITH EARTH.**

**MOST PESTICIDES WILL EITHER BE INACTIVATED AS THEY SOAK AWAY
THROUGH THE SUBSOIL OR BE ADSORBED ON TO SOIL PARTICLES,
SO THAT THEY WILL NOT TRAVEL FAR FROM THE VICINITY OF THE PIT.**

**THE PIT SHOULD BE $\frac{1}{2}$ - 1 METRE DEEP,
AND THE BASE SHOULD BE DRY BEFORE USE**

Examples of waters that can be disposed of in a pit:

- small quantities of unwanted liquid pesticide in diluted condition, and further diluted at least ten times;
- water used for washing out equipment;
- water used for washing hands and protective clothing;
- water used for drum decontamination.

Subsidiary points:

1. The pit should be dug more than 100 metres away from streams, wells, or houses.
2. The water should be allowed to soak away slowly, and the pit should be refilled slowly so that no water overflows the pit.
3. Disposal of unwanted pesticide is wasteful, and can be avoided by care in calculating the amount of pesticide needed.

Suggested visual aid: Photograph of man pouring water into a dry pit.

Section: IV Protection of others
Subject: B Other organisms: the environment
Number: 3 Disposal of wash water as a diluent

Main points:

Normally wash water should be disposed of in a soak pit. However, when the ground water level is high, a dry pit cannot be dug. In this case, an alternative has to be found.

**WASH WATER CAN BE USED
TO MAKE UP A DILUTION OF THE SAME PESTICIDE
ON THE NEXT DAY THAT THE PESTICIDE WILL BE USED.**

**THE WASH WATER SHOULD BE COLLECTED
IN A CLEARLY MARKED DRUM WITH A TIGHT LID.**

**IF THE DRUM IS TRANSPORTED, IT SHOULD BE TREATED IN ALL RESPECTS
AS A CONTAINER OF PESTICIDE.
BUT WHEN THE WATER IS USED FOR DILUTION,
IT SHOULD BE MEASURED AS IF IT WAS WATER.**

Subsidiary points:

1. If sprayers have contained a formulation which has tended to be lumpy, problems can arise if the lumps are present in the wash water and subsequently in the water used for dilution. These can be avoided if either the wash water drum is allowed to stand for some hours before the water is used, and the drum is emptied slowly, or if the wash water is passed through a sieve as it enters the wash water storage drum.
2. This method of disposal can also be used in cases where water for dilution is short at the site of application and has to be carried from the base. This often means that no water is available for washing at the application site. The situation need not arise if the water is first used for washing and then used for the final dilution of the day, leaving only a small quantity for the final wash after work.

Suggested visual aid: Photograph of wash water being poured into a marked drum.

Section: IV Protection of others
Subject: B Other organisms: the environment
Number: 4 Disposal of containers by burying

Main points:

Large pesticide containers are usually steel or cardboard drums, and smaller ones are aluminium bottles, and plastic bags and liners. All contain residues of concentrated pesticide, and present the same hazard to the workers handling them as if the workers were mixing the pesticide. If containers cannot be returned to suppliers, there are three ways of disposing of them, the first is by burying.

**A HOLE SUITABLE FOR BURYING CONTAINERS MUST MEET THE SAME
STANDARD**

OF DRYNESS AS THE HOLES FOR DISPOSING OF WASH WATER.

**THE HOLE MUST BE DEEPER, SO THAT WHEN FILLED, THE HIGHEST POINT
OF THE BURIED CONTAINERS SHOULD BE MORE THAN ½ METRE BELOW THE
SURFACE.**

**ALL CONTAINERS SHOULD BE PIERCED OR CRUSHED BEFORE BURYING
(except aerosol containers).**

Subsidiary points:

1. It is difficult and often dangerous to perforate or crush metal containers, and therefore this method of disposal is most suited to paper drums and plastic containers and liners. It is not possible to decontaminate these containers and they **MUST** be destroyed. It is not necessary to rinse them before burying. Aerosol containers must not be perforated.
2. Addition of manure or other rotting organic matter to the hole before filling will assist microbial breakdown of the pesticide.
3. If an approved disposal site for chemical wastes is in the vicinity, all empty containers should be sent there.

For discussion:

What protection must be worn by those handling empty containers for disposal?

Other information:

The priorities in the methods of disposal will depend on the facilities available in different countries.

Suggested visual aid: Photograph of card drums and plastic bags being placed in a deep pit, prior to burying.

Section: IV Protection of others
Subject: B Other organisms: the environment
Number: 5 Disposal of containers by burning

Main points:

This method of disposal can be used for boxes, card drums, plastic liners, and other combustible materials, but should only be considered if a pit cannot be dug and there is no other way of disposing of the containers in an approved site for chemical wastes.

**THE SMOKE MAY CONTAIN POISONOUS FUMES
AND THE PUBLIC MUST NOT BE PUT AT RISK.**

THE FIRE MUST BE DOWN WIND OF ANY BUILDINGS.

THE FOLLOWING RULES MUST BE FOLLOWED:

- FIRST EMPTY THE CONTAINERS OF ANY PESTICIDE AND RINSE OUT PLASTIC LINERS;
- DISPOSE OF THE RINSINGS AS FOR WASH WATERS;
- MAKE THE FIRE IN A PIT, AT LEAST 100 METRES FROM ANY WELL, RIVER, OR HOUSE;
- AT LEAST ONE WORKER MUST STAND BY THE FIRE UNTIL THE CONTAINERS HAVE BEEN REDUCED TO ASH;
- THE WORKER MUST BE SURE TO STAND AT THE WINDWARD SIDE OF THE FIRE, AND AVOID THE SMOKE;
- WHEN ALL THE CONTAINERS ARE BURNT, COVER THE ASH WITH EARTH AND REFILL THE PIT.

For discussion:

What type of protection should the worker wear?

Other information: In some countries disposal by burning, except in an approved furnace, is prohibited.

Suggested visual aid: Photograph of worker tending fire, wearing correct protection.

Section: IV Protection of others
Subject: B Other organisms: the environment
Number: 6 Decontamination of containers

Main points:

THE ONLY CONTAINERS THAT CAN BE DECONTAMINATED ARE THOSE MADE OF METAL OR RIGID PLASTIC, AND HAVE CONTAINED PESTICIDE CONCENTRATES OF MODERATE HAZARD OR LESS.

Containers made of polyethylene, and which have contained organophosphorous or carbamate pesticides cannot be decontaminated. These pesticides are selectively absorbed by the polyethylene.

DECONTAMINATION SHOULD ALWAYS BE CARRIED OUT IN A WELL DEFINED AND SECURE AREA.

FOR SAFE DECONTAMINATION, THE FOLLOWING RULES MUST BE OBSERVED:

- CAREFULLY EMPTY OUT ANY REMAINING PESTICIDE IN THE CONTAINER AND DISPOSE OF THIS SAFELY;
- RINSE THE CONTAINER CAREFULLY WITH AT LEAST HALF OF ITS VOLUME OF CLEAN WATER AND DISPOSE OF THE RINSE AS WASH WATER;
- FILL THE CONTAINER COMPLETELY WITH CLEAN WATER AND LEAVE TO SOAK A MINIMUM OF 24 HOURS;
- EMPTY THE WATER INTO A WASH WATER DISPOSAL PIT;
- REPEAT THE OPERATION FOR TWO MORE 24 HOUR PERIODS;
- OBLITERATE THE LABEL.

THE CONTAINER SHOULD NOT BE USED FOR THE STORAGE OF HUMAN OR ANIMAL FOOD OR DRINK, AND SHOULD BE MARKED ACCORDINGLY.

Subsidiary point:

Decontamination operations must be carefully supervised, and only conscientious workers should be employed in this task.

For discussion:

What protection should workers decontaminating containers wear?

Suggested visual aid: Photograph of containers in a secure area, standing filled to the brim with water.

Section: IV Protection of others
Subject: B Other organisms: the environment
Number: 7 Disposal of large quantities of unwanted pesticide

Main points:

The disposal of large quantities of unwanted pesticide is difficult, and the method used will depend on national circumstances. It should **NEVER**:

- be put in any river, lake, or sea;
- be put in any landfill unless it has been specifically approved for the disposal of chemical wastes;
- used for any purpose other than those stated on the label;
- given to any other person or organization unless it is legal to dispose of it in this way, and for the other party to receive it.

THE FOLLOWING ARE SOME OF THE OPTIONS:

- RETURN IT TO THE SUPPLIER.
- INCINERATION AT A HIGH TEMPERATURE WHICH WILL VARY WITH THE FORMULATION.

IN HIGHLY EXCEPTIONAL CIRCUMSTANCES:

- DEEP BURIAL IN A DRY HOLE OR DISUSED MINE.
- WALLING UP IN A DRY CAVE.

Subsidiary points:

1. It should be realized that disposal of unwanted pesticide almost always involves expenditure, and this should be budgeted.
2. All pesticides have a limited shelf life, and the active ingredient diminishes during storage. No pesticide should be used after two years from the date of manufacture or formulation, or, if these are not on the label, from the date received in store, without an analytic test for the concentration of the active ingredient. If there has been a marked reduction in this, or if there has been a change in the physical form or colour of the formulation, its acute toxicity should also be checked. The manufacturer or the formulator should be consulted about this.

Suggested visual aid: No special aid needed.