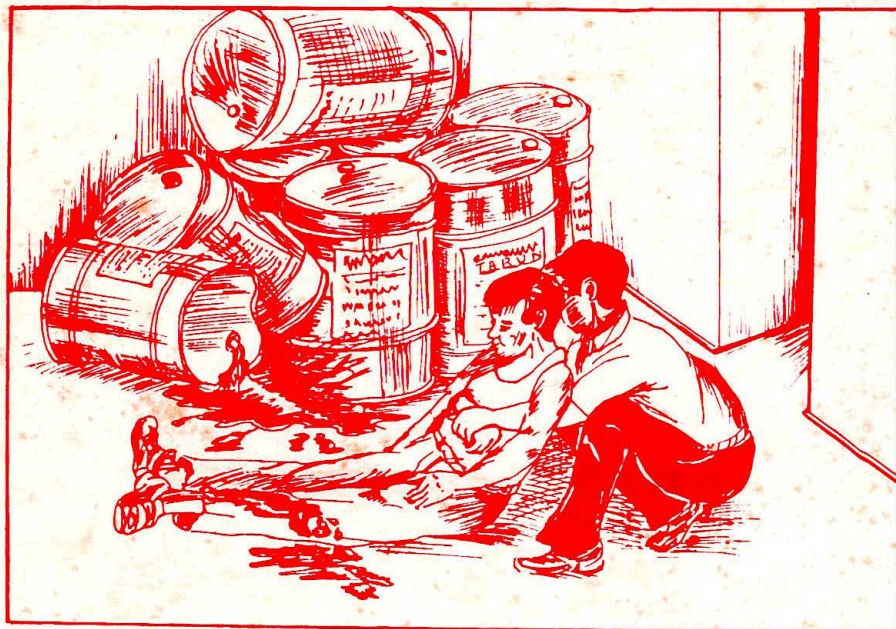


# Manual for Community Health Workers on Diagnosis and Treatment of Pesticide Poisoning



**UNDP/WHO SEARO Project on Safety and Control of Toxic Chemicals  
and Pollutants in Collaboration with Malaria Research Centre**

**MANUAL FOR COMMUNITY HEALTH WORKERS  
ON DIAGNOSIS AND TREATMENT OF  
PESTICIDE POISONING**

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## PREFACE

Pesticide poisoning cases are reported sporadically from almost all over the country. Acute or chronic poisoning may occur by any of the pesticides used in the protection of crops, storage of grains, control of household pests, the vectors of human and animal diseases and the nuisance insects. The environment may be contaminated by improper disposal of insecticides or their containers or contaminated articles. At times poisoning may be encountered as a result of an attempt to suicide or accident in the transportation or application etc. Large scale poisoning cases have been reported by inadvertent food contamination. In intensive agriculture areas or newly irrigated tracts which have opened up for cash crop cultivation excessive use and at times misuse of pesticides and very often careless handling of the pesticide has been observed. By and large pesticide poisoning is due to accident or negligent handling. Cases of poisoning may become serious or fatal due to lack of recognition and non-availability of emergency treatment. Fortunately it is possible to completely avoid poisoning by preventive methods, and if there is a case of poisoning early recognition of the symptoms of poisoning and prompt emergency treatment can save the patient.

At the end of the course community workers should in turn become proficient in recognition and emergency treatment of poisoning cases. A community health worker should be able to acquire basic knowledge on various types of pesticides used in public health, agriculture and protection from house hold pests; likely hazards associated with each pesticide; do's and don't's in the use and safe storage of pesticides; recognize early symptoms, administer first aid treatment and arrange immediate medical help with full details of the source of poisoning and about the chemical and history of the patient to obtain correct treatment.

For further information, please contact Chief, Promotion of Environmental Health, South East Asia Regional Office, New Delhi, through the Medical Incharge or Chief Medical Officer of your area.

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**PESTICIDES CAN CAUSE  
DEATH OR IMPAIRMENT TO HUMAN BEINGS  
THEREFORE, COMMUNITY HEALTH WORKERS SHOULD KNOW:**

- THE MECHANISMS, SIGNS AND SYMPTOMS OF POISONING**
- TYPICAL HIGH RISK SITUATIONS**
- APPROPRIATE PROTECTIVE MEASURES**

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## SECTION I

### DEFINITION OF 'PEST' AND 'PESTICIDE'

1. A PEST IS AN ORGANISM WHICH IS TROUBLESOME, DESTRUCTIVE, OR CARRIES DISEASE TO PLANTS OR ANIMALS
2. ANYTHING WHICH KILLS A PEST IS A PESTICIDE
3. THIS COURSE DEALS WITH CHEMICAL PESTICIDES IN LIQUID OR SOLID STATE

Commonly used pesticides are toxic chemical substances which should be handled carefully. There are other kinds of pesticides such as biological agents (bacteria, fungi), but these are not in common use. The rules for the safe use of these are similar in most respects to those for chemical pesticides.

### FORMULATIONS

Different Types of formulations of pesticides are:

1. *Wettable powder*

This is also known as water dispersible powder. It is added to water and mixed.

Examples - DDT, BHC

2. *Emulsifiable concentrate*

This is also mixed with water. It can cause more contamination as compared to wettable powder.

Example: Malathion, Cypermethrin

3. **Granules**

These are spread on the ground and are not diluted.  
Example : Baygon bait

4. **Dusts**

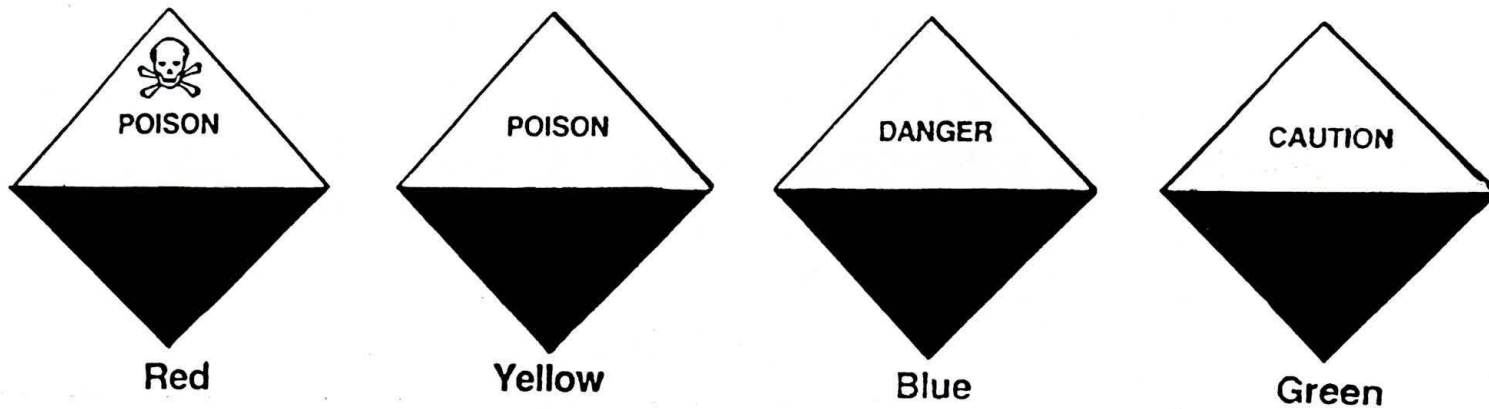
They are also not diluted.  
Example : Paris green

**NATIONAL LABELS ACCORDING TO HAZARD CLASS**

Pesticides are labelled according to their toxicity.

In India, Rule 19 of the Insecticide Act calls for warning symbols which are diamond shaped. The lower triangle is coloured to indicate degree of toxicity of contents, upper triangle contains signal words for cautioning.

Red - Extremely toxic      Blue - Moderately  
yellow - Highly toxic      Green - Slightly toxic



Labels convey information on hazard and toxicity

## ROUTES OF ENTRY OF PESTICIDES

There are four routes by which pesticides can enter the body.

(i) The first route is through the MOUTH.

At work:

- by eating and drinking while handling pesticides
- by smoking while handling pesticides

At any time:

- by taking a drink from some container which previously had pesticide in it.
- by leaving any object contaminated with pesticides in the way of young children.



Most common mode of entry of pesticides through oral route.



Do not spray or dust into the wind

(ii) The second route of entry is through the LUNGS by inhaling the pesticide.

This can be done by breathing in:

- vapour
- light spray
- light dust



The lungs are a primary route of entry for vapours fumes and dusts.



(iii) The third route of entry is through the intact SKIN.

This is usually from exposure to spray or dust.  
More pesticide enters through the skin.

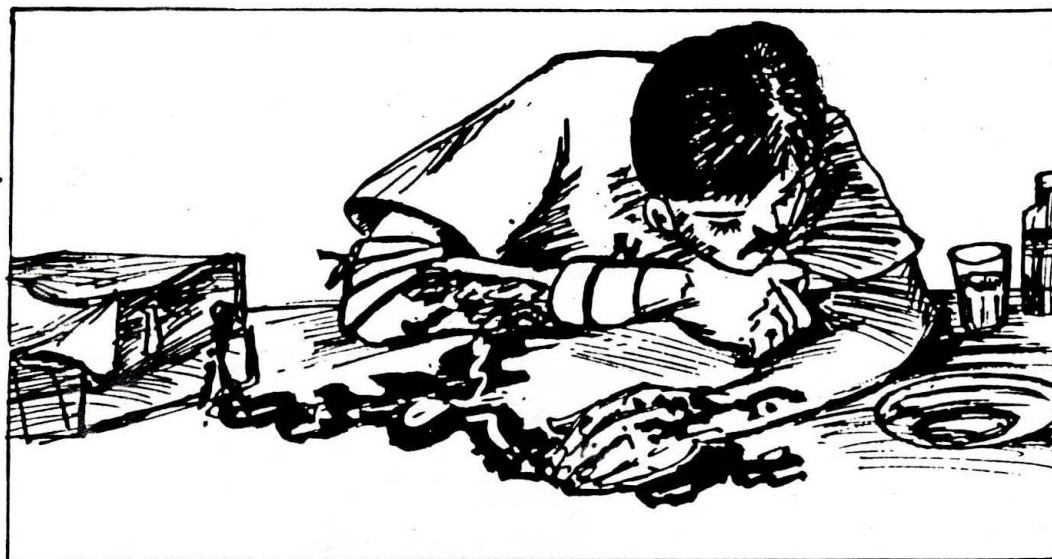
- if the formulation is a liquid
- if the formulation is concentrated
- if the skin is warm.

You cannot see any marked effect on the skin from where the pesticide has entered into the body.



Some pesticides can be absorbed directly through the skin.

- 
- (iv) The fourth route of entry of pesticides into the body is less common. It is through openings in the skin, that is through WOUNDS and RASHES. These must be protected from any contact with pesticides.



Never allow pesticides to come in contact with cuts or wounds

The most common route may be inhalation, while spraying.

At home pesticides may enter the body through contaminated food and other liquids. If volatile pesticides with high vapour pressure are used or handled at home, pesticide can enter through inhalation also. Accidental spillages may cause entry through skin.

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## SECTION II: DIAGNOSIS & TREATMENT

Signs and symptoms of intoxication: emergency treatment

### ORGANOCHLORINES

Poisoning by organochlorine compounds causes -

at first :     irritability  
                 headache  
                 general feeling of tiredness

then     :     giddiness  
                 vomiting  
                 collapse  
                 muscle twitching  
                 convulsions (fits)

#### *Emergency Treatment*

If a person seems to be suffering from organochlorine poisoning:

(a) **if a person is not breathing:**

- give artificial respiration

(b) **if person is breathing but is not conscious:**

- turn on to face with head to one side
- keep quiet
- watch breathing
- send for, or transport to medical aid
- in case of convulsions (fits) gently restrain person to avoid injury.

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c) **if person is breathing and is conscious**

- keep very quiet
- send for, or transport to medical aid
- if person has drunk poison, induce vomiting

### **ORGANOPHOSPHATES**

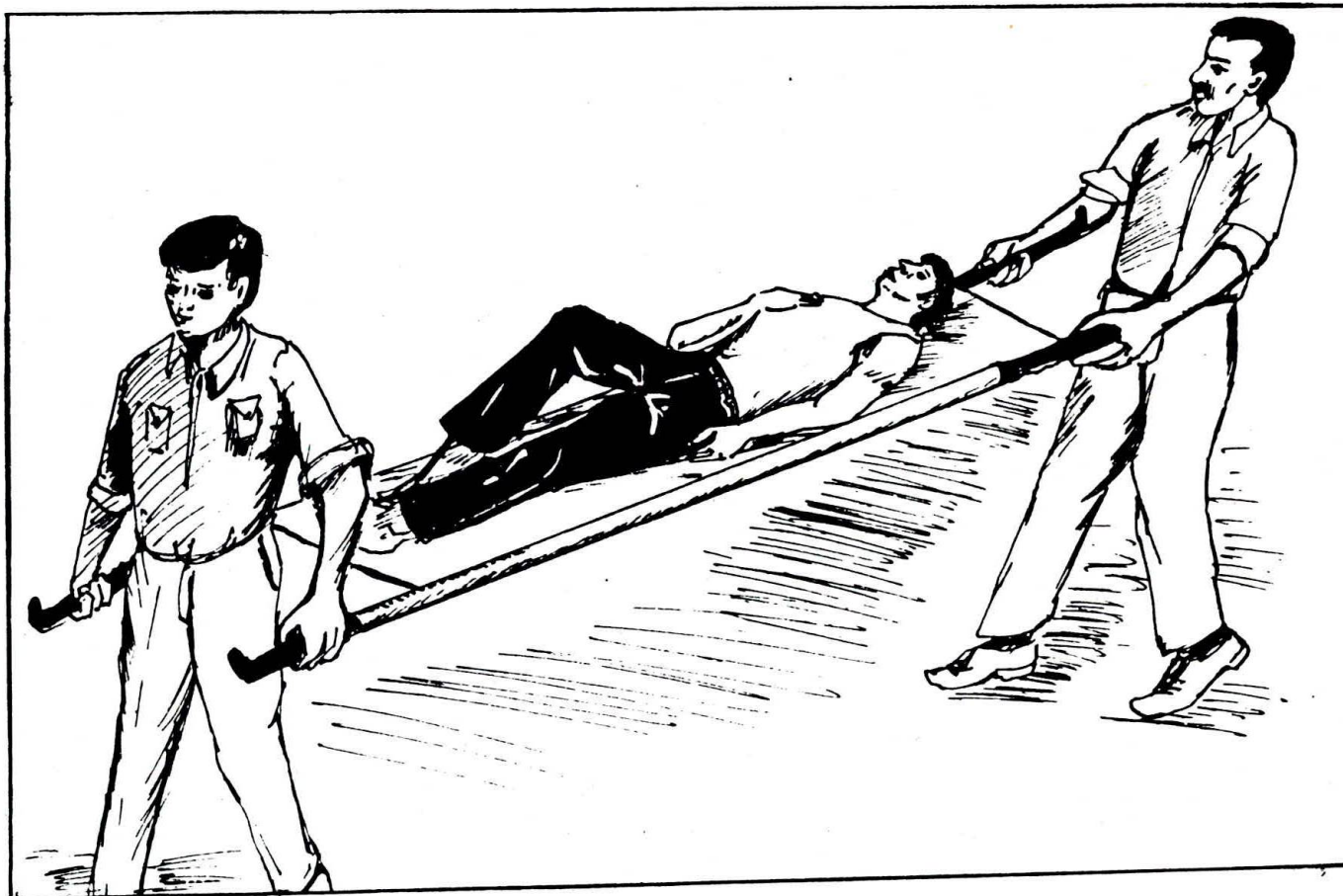
Poisoning by organophosphorus compounds causes -

at first :      sweating  
                  watering of mouth  
                  tearing  
                  weakness  
                  giddiness  
                  stomach cramps  
                  blurred vision

then :          pin-point pupils  
                  vomiting  
                  collapse  
                  muscle twitching  
                  convulsions (fits)

If a person seems to be suffering from **organophosphorus** poisoning treatment is urgent.

1. If atropine is available give 2 mg I/V and repeat after 10-15 minutes if symptoms not improved.
2. **If a person is not breathing:**
  - give artificial respiration



In all cases send for or transport to medical aid if possible.

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3. **If person is breathing but is not conscious:**

- wash contaminated skin
- turn on to face with head to one side
- watch breathing
- in case of convulsions (fits) gently restrain person to avoid injury.

4. **If person is breathing and is conscious:**

- if person has drunk poison, induce vomiting
- wash contaminated skin
- watch carefully and do not leave alone for half a day even if the person seems to have recovered

**ATROPINE DOSAGE FOR BASIC HEALTH WORKERS**

If a person seems to be suffering from **organophosphorus** poisoning:  
Treatment is urgent.

1. Give atropine 2 mg I.V. every 10 minutes until -

face flushes  
pupil dilates  
pulse rises to 140

2. Repeat if condition deteriorates again

3. Keep under observation 48 hours: recovery should be complete.

4. Fits can be controlled with diazepam 5 mg I.V.

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5. **Do not give any other** tranquillisers

barbiturates

sedatives

6. Give atropine immediately but do not forget other treatment:

- if not breathing give artificial respiration
- if poison swallowed, pump out stomach
- if skin contaminated wash with soap and water

### CARBAMATES

Poisoning by carbamate compounds causes:

at first :     sweating  
                  dizziness  
                  weakness

then     :     abdominal cramps  
                  vomiting

Note: Onset is sudden. Symptoms usually start to improve in 1-2 hours.

Treatment: Keep quiet and transport to medical aid if person does not seem to be recovering.

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## CHLORONTROPHENOLS

Poisoning by **chloronitro compounds** causes:

at first :      breathlessness  
                 very high temperature  
                 weakness

then     :      convulsions (fits)  
                 unconsciousness

Treatment:    Keep person as cool as possible and transport to medical aid. cool body as rapidly as possible with wet tepid clothes. Note that yellow discoloration of the skin does not wash off.

## BIPYRIDYLS

Bipyridyls (paraquat and diquat) cause serious poisoning when taken **by mouth**. Patient may suffer from malaise or weakness and have ulceration of mouth.

**Whether or not** symptoms are apparent - **immediately**

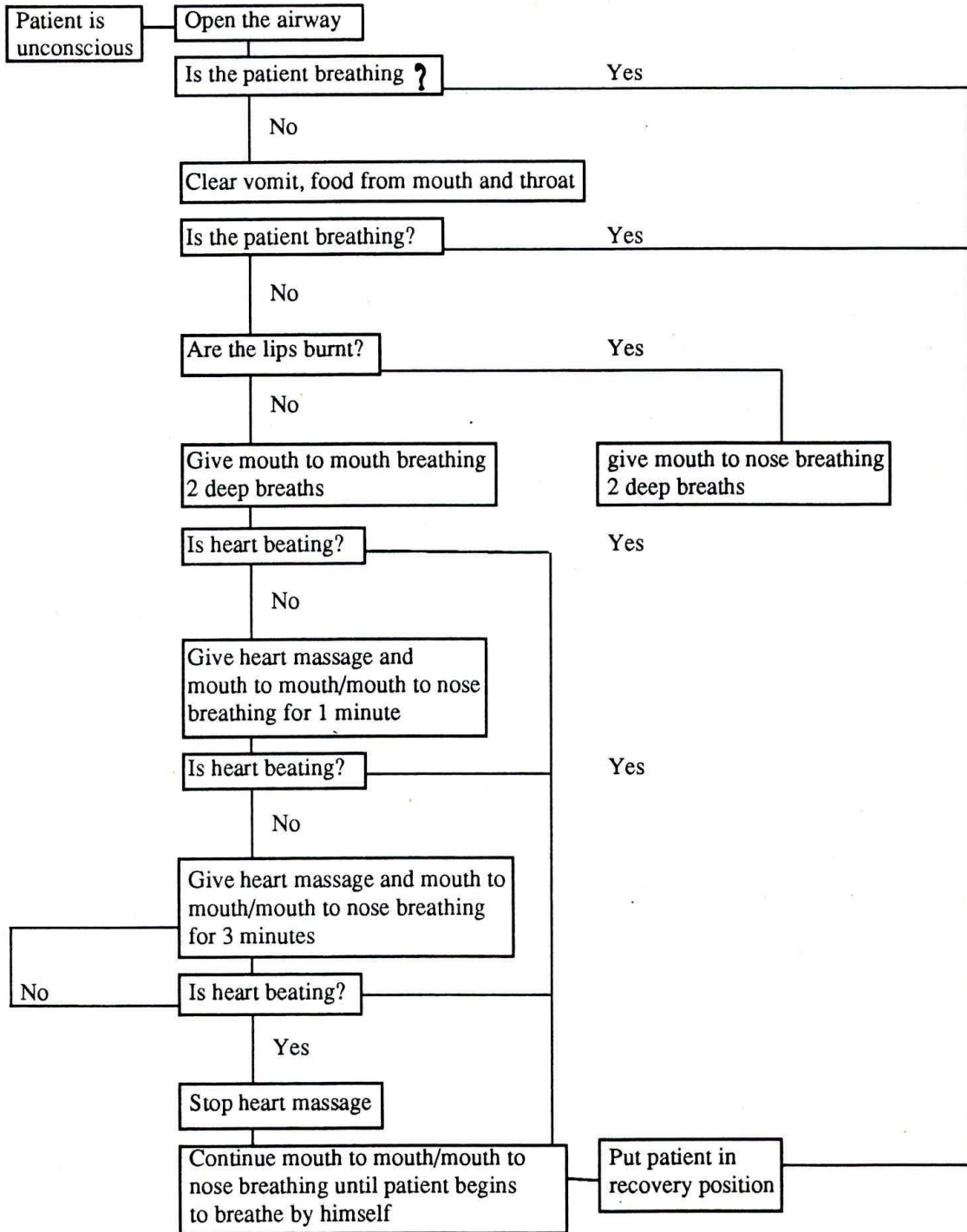
Induce vomiting:      then  
                                 wash out stomach with plenty of water

If available, leave behind in stomach bentonite suspension approx. 7%, or fuller's earth 30%. If this treatment is given within 2 hours, chances of recovery are good. Otherwise, the patient tends to deteriorate over a 14 day period.

Send for further medical attention if available only after stomach wash.



# FIRST AID



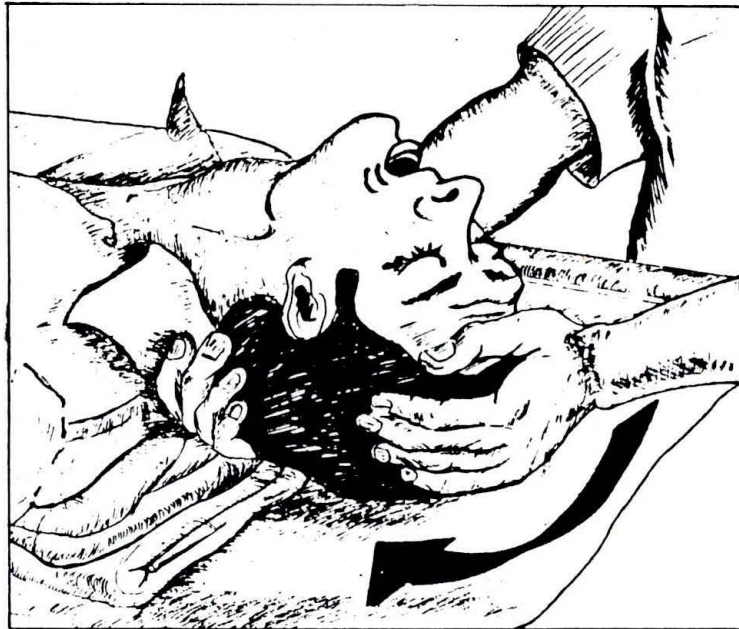
## EMERGENCY TREATMENT (General)

### 1. ARTIFICIAL RESPIRATION

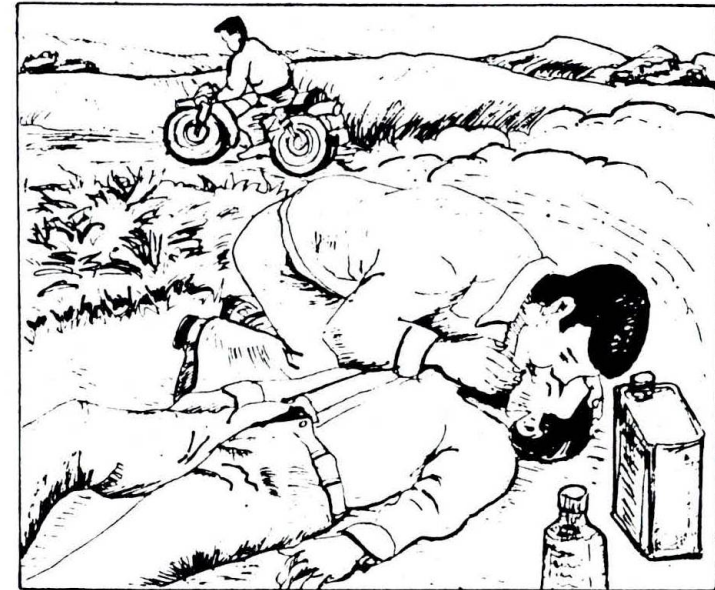
Artificial respiration is given when a person is not breathing on his own.

1. Make sure that airway is clear by pulling chin up and head back.
2. Use mouth to mouth method, through a cloth.
3. Fill the chest of the person with air 10 times per minute. Watch the chest rise to be sure airway is not blocked.

If medical aid is available, continue until the doctor says to stop. If medical aid is not available, and the pulse is beating continue as long as possible. If the pulse is not beating, stop after half-an-hour.

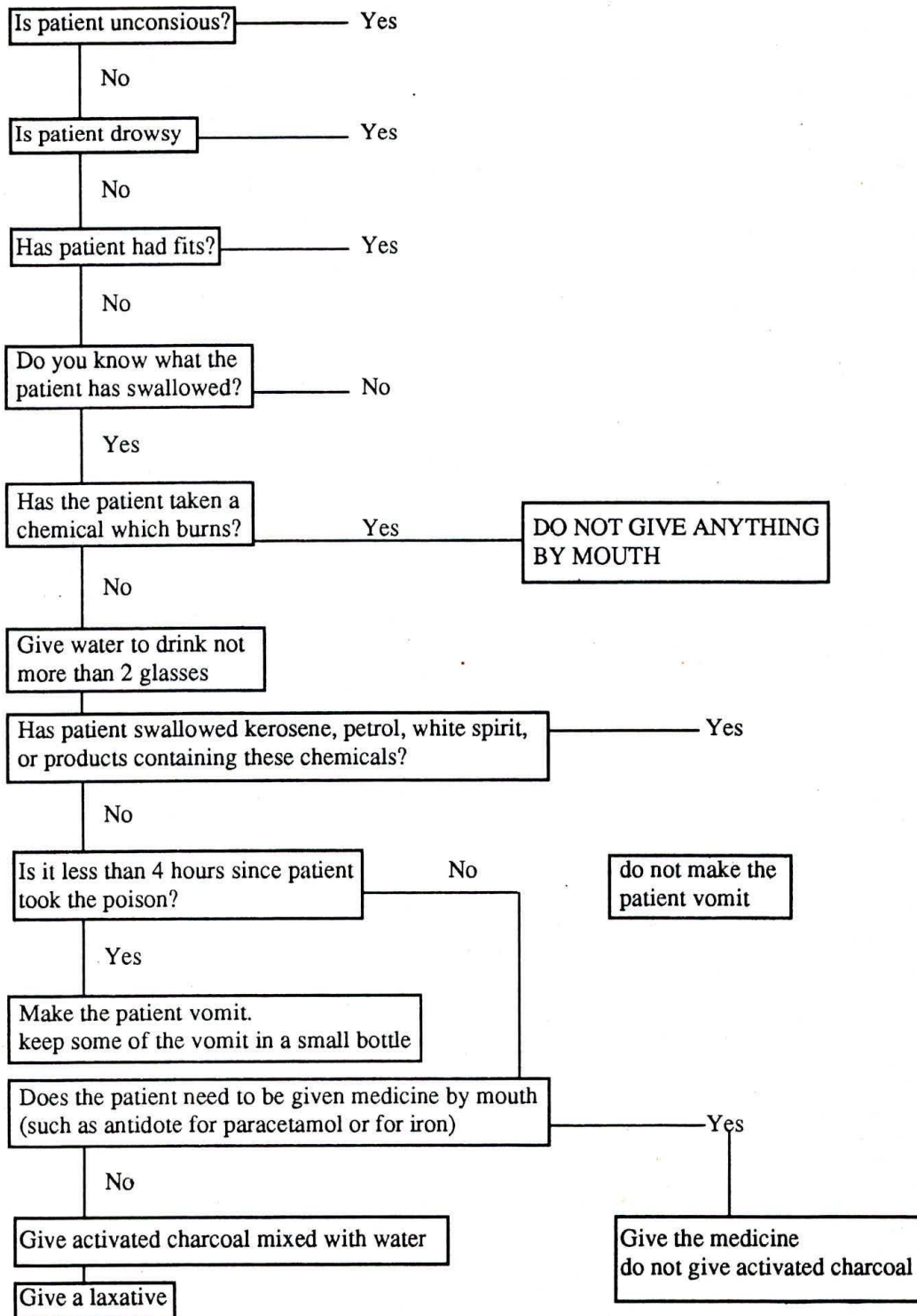


51 Tilt the unconscious patient's head backwards to open his air passages.



Give the patient artificial respiration and send immediately for medical aid.

## WHAT TO DO IF THE PATIENT HAS SWALLOWED POISON?



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## 2 VOMITING

A). When a person vomits it is important that none of the vomit should be breathed into the lungs.

If the person is unconscious, lie him front downwards, head downwards, head down and turned to one side. Transport the person in this way in case he vomits. Never give anything by mouth to an unconscious person.

B). To induce vomiting:

- place person head downwards
- put your fingers in person's mouth and lightly tickle the back of throat
- do not give slat mixtures to induce vomiting.

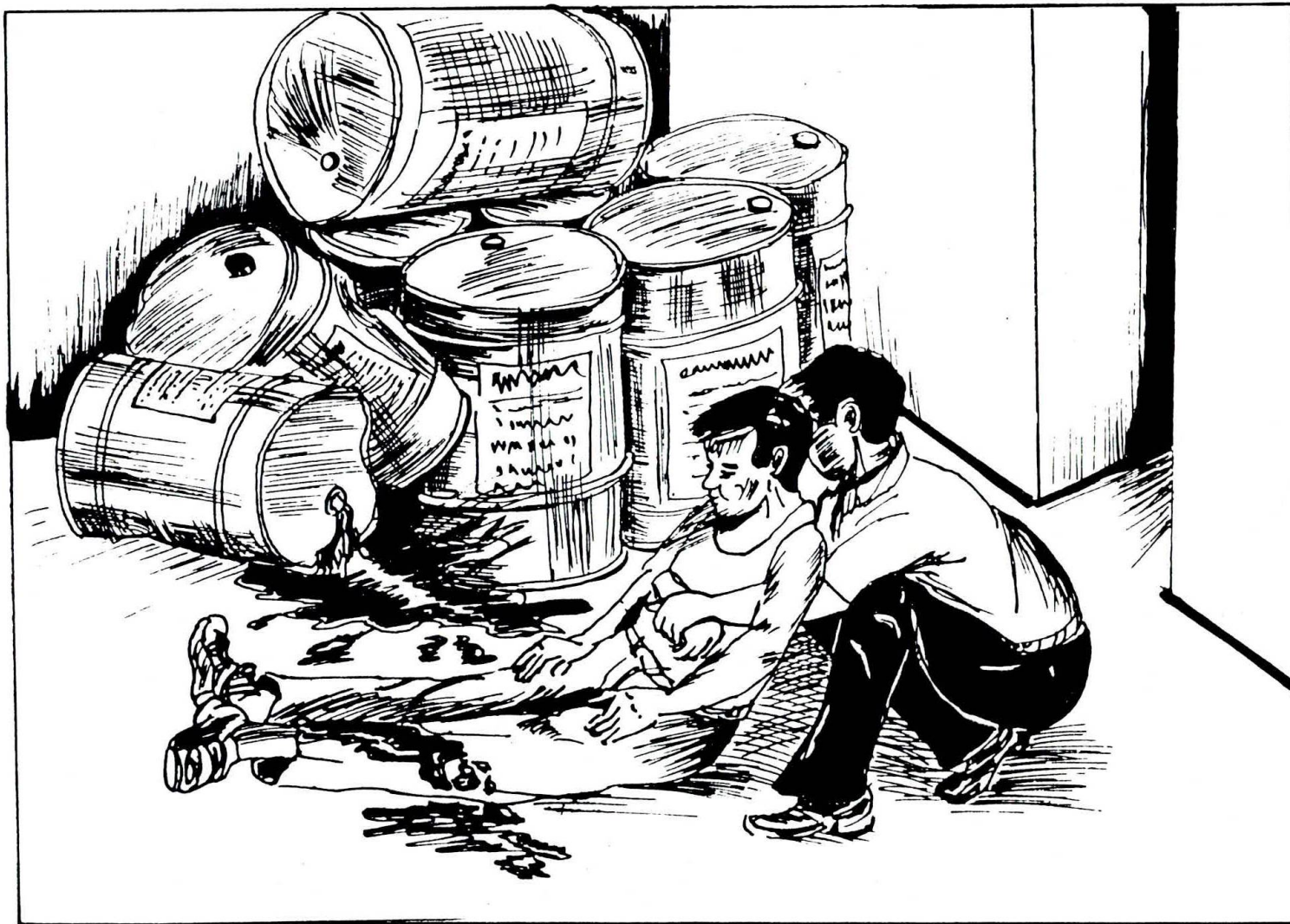
Do not try to induce vomiting if the person is unconscious.

Contraindications for induction of vomiting

1. Unconconscious patient
2. Convulsing patient
3. If ingested poison is strong alkali, corrosive and or kerosene.



Induce vomiting in the conscious patient who has ingested highly toxic material



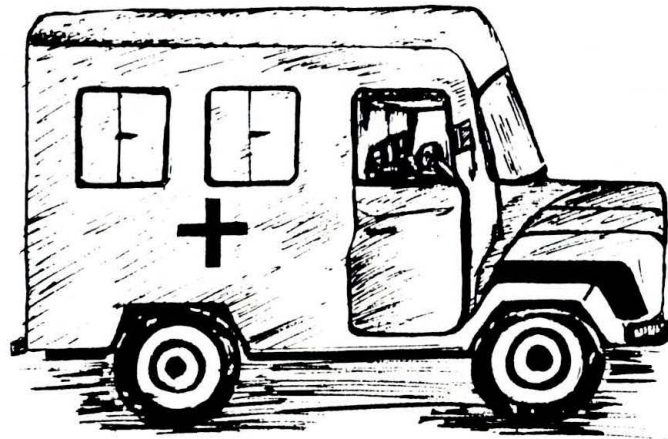
The patient should be removed from contaminated site immediately.

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### 3 TRANSPORTATION

If the person seems to be poisoned, transport to hospital/medical centre as soon as possible, but -

- A) First
  - induce vomiting if pesticide taken by mouth
  - remove contaminated clothing and quickly wash skin.
  - give any other treatment recommended.
- B) Disturb person as little as possible, i.e., do not drive very fast over bumpy roads.
- C) Take a pack of pesticide with you or a copy of label. This is particularly important to identify exactly the pesticide used.
- D) Take a sample of vomit if available. This is for later laboratory analysis if required.
- E) Be prepared to tell the medical attendant how much and what sort of pesticide the person has handled in last few days.



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## LOCAL TREATMENT (general)

### 1 WASHING OUT OF EYE

Pesticides splashed into the eye are rapidly absorbed and may also irritate the eye.

A splash in the eye must be washed out at once with a lot of clean water.

Water may be poured from cup or tea pot.

It is easier if a third person holds eye open.

Continue washing for at least ten minutes.

Organophosphorus compounds splashed in the eye can cause marked blurring of vision: this is a temporary effect which may last several hours.



Contamination in the eye must be washed immediately with clean water.

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## 2 WASHING SPLASHES OFF SKIN

If a man gets a drop of pesticide on his skin, or if he has a spill which soaks parts of his clothing, it is important to remember that most pesticides can be absorbed into the body through the skin.

Therefore, IMMEDIATELY

- Remove any soaked clothing
- Wash skin with a lots of clean water and with soap if available.
- Watch out for any symptoms of poisoning.
- If a large area of skin was splashed or was contaminated by soaked clothing, the man should stop work, at least for the day.

How may major soakages of clothing occur and how may they be dealt with in local circumstances?

Major soakages of clothing occur due to

- 1) Entry without protective clothing where aerial spraying is being done.
- 2) Spraying on crops or trees of higher elevation with high volume sprayers.
- 3) Spraying in densely grown crops or bushes.
- 4) Accidental spillages due to leaks on spray tanks.
- 5) Spraying against wind current.

Local level measures to major soakages of clothing with pesticides.

- 1) Prior notice to all the public of the area where aerial spraying is going to be done and precautions to be taken during that period should be strictly adhered to.
- 2) A longer spray boom or lance should be used. Protective clothing should also be worn.
- 3) Protective clothing should be worn & care should be taken that crops & bushes should have proper alley ways for moving in between for various agriculture operations including spraying of pesticides.
- 4) Sprayer tanks should be checked for leakages before use and protective clothing should also be worn.
- 5) Spraying should never be done against the wind.





Wash the patient thoroughly with clean water



Spills should be wiped off when water is not available.

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## SECTION III: APPLICATION OF PESTICIDES

### A. APPLICATION BY TASK

Pesticides are applied in many different ways.

#### 1. AGRICULTURE HAND SPRAY

Hand spraying of crops is probably the most common method of application. Insecticides and herbicides are often applied in this way.



Hand spraying

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## 2. PUBLIC HEALTH; INDOOR RESIDUAL SPRAY

Most applications are outdoor but for the control of pests carrying disease, "indoor residual application" is used.



'Residual' means that the pesticide will remain effective for weeks or months

### 3. PUBLIC HEALTH; LARVICIDING

Pesticides can be used to kill insect larvae that grow and feed in water. This is larviciding.



Bioenvironmental control measures

a) Larvivorous fishes

Application of biocides

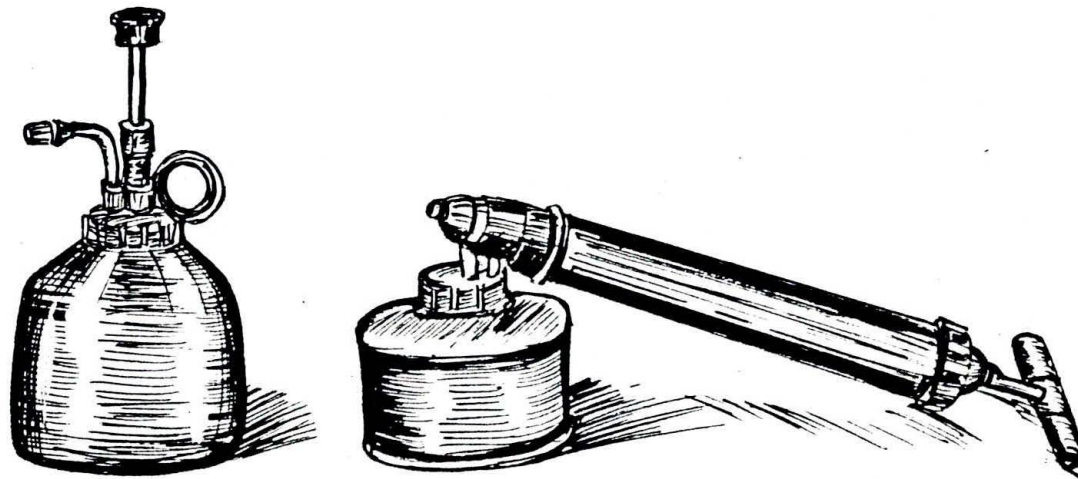
b) Minor engineering methods.

- filling of pits, ditches
- trimming of margins of ponds etc.
- drainage of low-lying areas.
- mosquito proofing of overhead tanks & wells.
- use of siphons

c) Other methods - use of EPS beads  
in wells, overhead tanks etc.

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#### 4 SPRAYING IN HOUSEHOLD



This is a **HOUSEHOLD SPRAY**; and is usually used to control nuisance-causing insects. The pesticide usually is of low toxicity and short action.

In India however, householders may obtain more toxic pesticides and use them unwisely.

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## B. APPLICATION BY EQUIPMENT

### 1. EXTERIOR HAND SPRAY



This is frequently used on low crops.

The tank may be pressurized by hand or motorized.

Regular maintenance of pumps is important for both efficiency and safety.

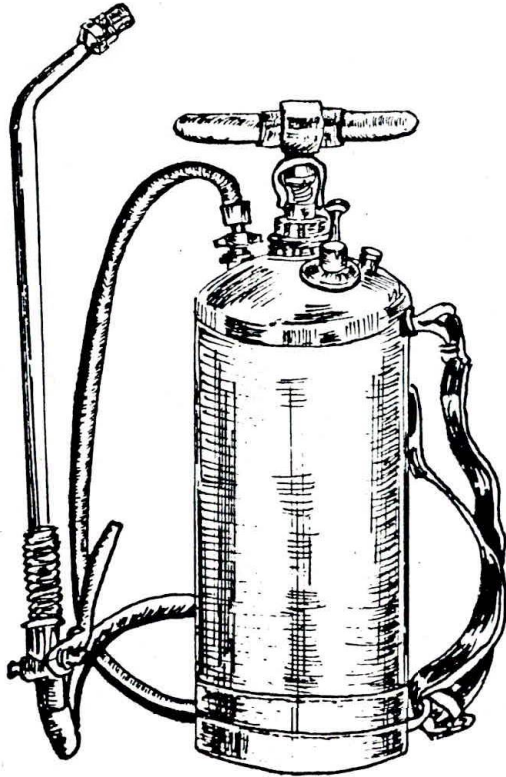
Supervisors should know how hand sprayers can be safely used and should pass on this information to their men.

What hazards unconnected with pesticide exposure occur with motorized pumps?

- Hazards - Fire hazard
- Blasting due to high pressure.

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## 2. INTERIOR HAND SPRAYER



Hand compression sprayer

This is used for indoor residual application

The tank is usually pressurized by hand.

Regular maintenance of the pumps is important for both efficiency and safety.

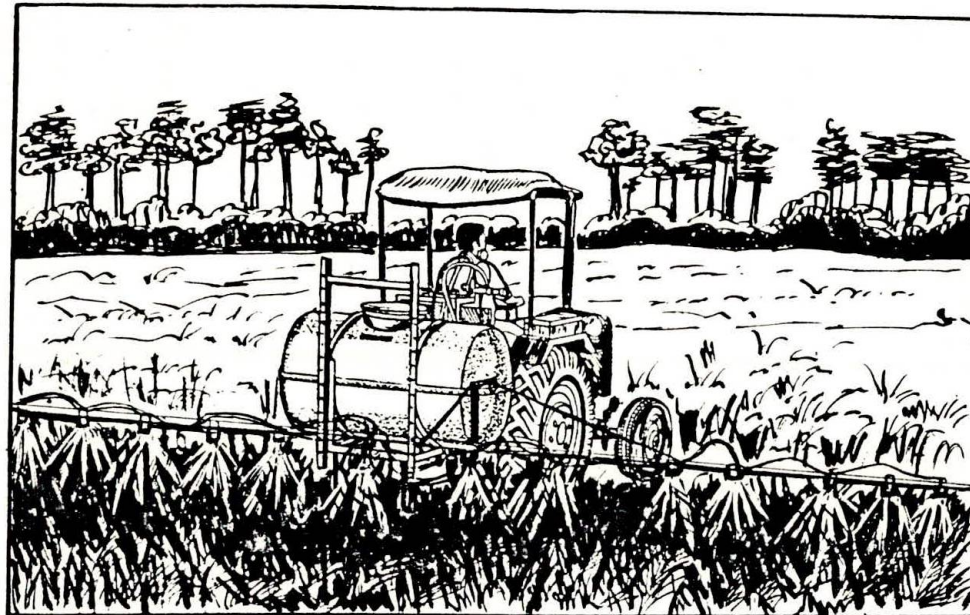
The sprayers must know how to use it properly and safely and the supervisor must ensure that he does so.

Which parts of pump particularly require maintenance?

1. Rubber washers wear out easily as they have to be replaced frequently.
2. The leather cap of plunger also gets eroded frequently. It also needs replacement whenever it is worn out.
3. Nozzles get clogged up frequently and they have to be cleaned properly before use (in case of pumps with direct nozzle connection).

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### 3. EXTERIOR MACHINE SPRAY



This is particularly used for spraying large areas of land or for trees.

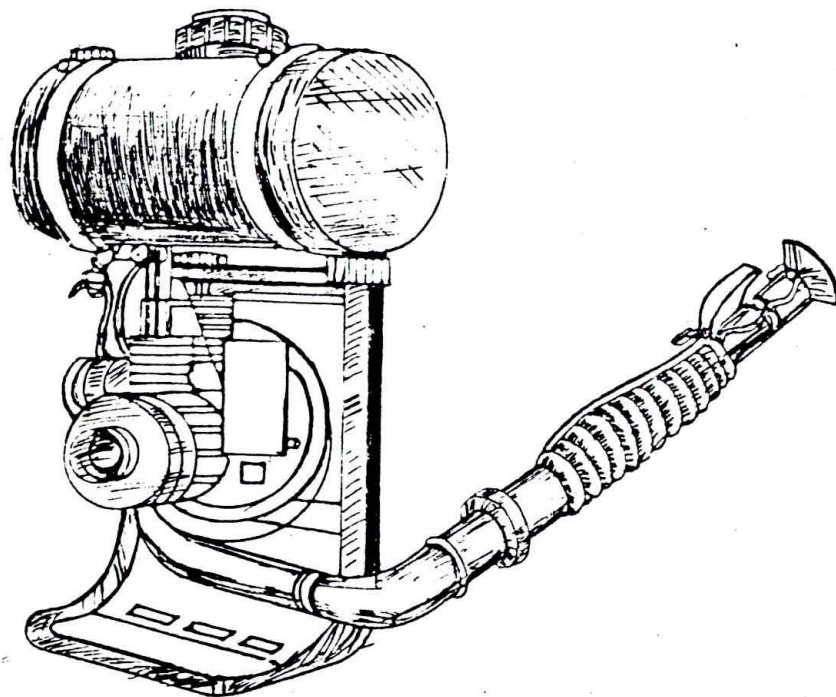
It is usually drawn by a tractor

The operator must know how to use it safely.



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#### 4. ULV HAND APPLICATION, EXTERIOR



ULTRA-LOW VOLUME (ULV) is a type of application where only small quantities of highly concentrated active ingredients are dispersed in very small droplets.

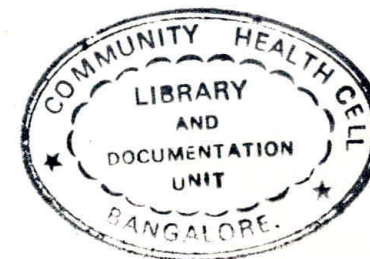
This may be done as a fog or a spray-mist. Fogs can be seen but sprays are very difficult to see.

A mist settles to the ground very slowly. The smallest droplets may take 1-2 hours.

The picture shows a type of hand held ULV sprayer. Some are motorized: others are electrically powered by batteries.

All those using ULV equipment must know how to use it safely.

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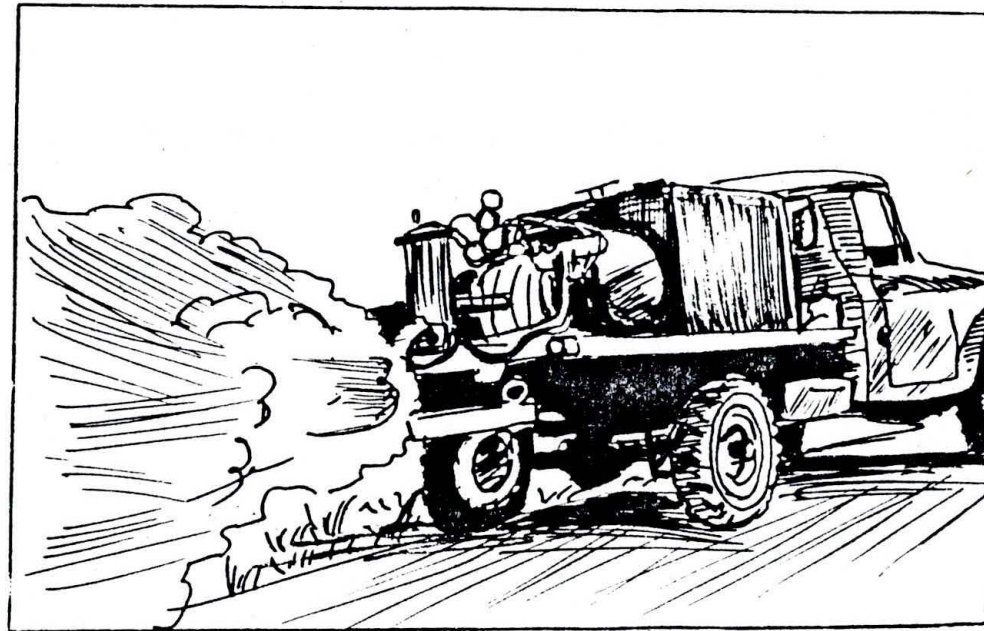


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## 5. ULV LECO

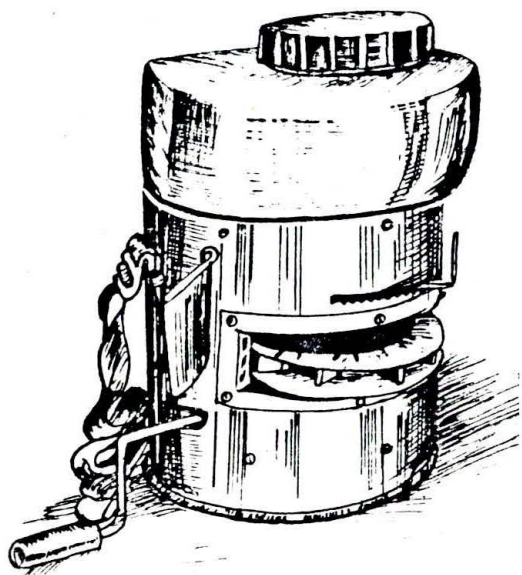
This shows a large **ULV SPRAYER** that has to be mounted on a vehicle. It is used mostly for the control of epidemics of dengue which is transmitted by mosquitoes.

This is a powerful machine and all those using it must be careful to use it safely.



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## 6. GRANULE OR DUST SPREADING



This applicator is used for spreading granules by hand.

They can also be distributed by machine in the same way as dusts.

pesticide concentrations in granules are usually low but the operator should know what he is using.

Dusts require particular attention in use and operators must know how to avoid drift.

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## SECTION: IV

### PROTECTION FROM POISONING

#### 1. EATING

No one should eat or drink while handling pesticides without first washing hands and face in clean water (with soap).

If food is taken to the fields, it should be carried in a tin with a tight fitting lid.

If a man eats or drinks without washing, by what route is he taking pesticides into his body?

The route of entry of insecticides in this case will be oral and it is called the oral exposure.



Always wash hands and face before meals

## 2. SMOKING

Those handling pesticide should never (be allowed to) smoke without first washing hands and face in clean water (and soap).

Cigarettes should be kept in a tightly closed tin if carried in overalls.

If a man smokes without washing, by what route is he taking pesticides into his body?

A person who smokes with pesticide contaminated hands will take pesticides into lungs through inhalation.



Never smoke with soiled hands

### 3. CHEWING

No one should chew (or prepare things to chew) while handling pesticides without first washing hands and face in clean water (with soap).

Never carry things to chew in overalls without using a tin with a tight fitting lid.

If a man chews without washing, by what route is he taking pesticide into his body?

A man who chew with pesticide contaminated hands, will take pesticides into the body through oral route.



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#### 4 BLOWING OUT NOZZLE

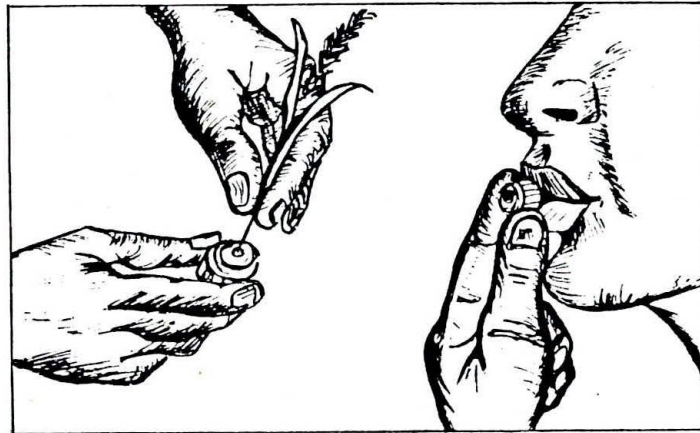
If a nozzle is blocked, no one should ever blow down it to clear it.

Instead remove the nozzle and press it against the pressure release valve of the pump.

Blocked nozzle should be cleaned using either a thin grass stem or stick or with soap and water.

If a man clears a nozzle by mouth, by what route is he taking pesticide into his body?

Pesticides will enter the body through oral route when spray nozzle is cleaned by mouth.



Blocked nozzles should be cleaned with a pin or stick; never blow out a clogged nozzle

## 5. WASHING HANDS AND FACE

Wash hands and face in clean water.

Use soap if available.

Always wash before eating, drinking, smoking and at the end of the day's work before returning to base.

If possible wash hands each time the pump is refilled.

At the end of the day, take a shower.

If there is no or little water available at the application site, it should be taken to the field in a clean drum (with a tap).

How does washing stop absorption of pesticides?

User may become contaminated accidentally by a splash or spill of pesticides. Washing will remove the chemical from skin.

What else should be washed, other than skin?

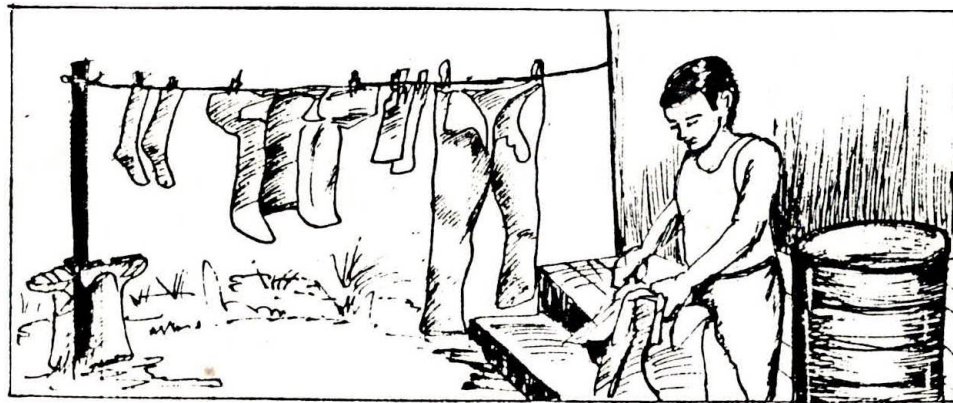
Apart from the body, eyes and clothes should be washed carefully.

## 6. WASHING CLOTHES

Working clothes should be washed every day in clean water.

How does this stop you taking pesticides into your body?

Removing and washing clothes will prevent absorption from surface of the body.



Wash clothes everyday with clean water



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## PROTECTION ACCORDING TO JOB

Educational objective: to define the clothing necessary according to the job, with emphasis on cleanliness of clothing.

### 1 HAND SPRAYMAN - AGRICULTURE

1. When spraying a crop with a pesticide of **moderate or low toxicity**, the sprayman should wear
  - i) an overall (or local dress).
  - ii) boots
  - iii) a brimmed hat (if the crop is high)
  
2. If the man is spraying, a pesticide of **high toxicity**, he should wear
  - iv) rubber or plastic gloves, and
  - v) a rubber or plastic apron.
  - vi) a pair of glass spectacles.

All clothes must be washed daily. Particular attention should be given to washing inside the clothing.

How may clothing best be washed?

Wash clothes separately from other laundry. Soak clothes in soap and washing soda for 1½ hours. Wash with clean soap and water. However, they should not be washed in river streams or lakes the water of which are used downstream by humans and other animals

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## 2. HAND SPRAYMAN - PUBLIC HEALTH

When spraying a hut the spraymen should wear

- (I) an overall
- (II) boots
- (III) a brimmed hat
- (IV) a pair of spectacles.

Some men prefer a scarf around the face but this should not become wet.

All clothes must be washed daily. Particular attention should be given to washing inside the clothing.



Spraymen both in agriculture and public health must wear protective clothing.

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### 3. MIXER

A mixer handles concentrated pesticide and must take extra care.

- He wears
- (1) an overall
  - (2) gloves
  - (3) boots
  - (4) a clean cloth over his mouth and nose
  - (5) an apron.

If a man is mixing a **highly toxic pesticide** he also needs

- (6) a respirator containing a cartridge, which should be renewed at least daily.
- (7) a pair of glass spectacles

All clothes and equipment must be washed daily, inside and out.

### 4. BAGGER

A man who is bagging pesticide handles concentrated pesticide and must take extra care.

- He wears
- (1) an overall
  - (2) gloves
  - (3) boots
  - (4) a clean cloth over his mouth and nose
  - (5) an apron

If a man is bagging a **highly toxic pesticide** he also needs

- (6) a respirator containing a cartridge which must be renewed at least daily.
- (7) a pair of glass spectacles

All clothes and equipment must be washed daily, inside and out.

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## PROTECTION OF BODY

Educational objective: to define in more detail the clothing and equipment used for protection of different parts of the body.

### 1. TRUNK AND PARTS COVERED BY OVERALL

An overall is probably the most convenient way of protecting the body.

A good overall covers 85% of the skin.

National dress can also be used as overall if

- it is made of cotton so that it can easily be washed and dried.
- it covers the body without openings.
- it has long sleeves
- it is long enough to cover the top of the boots, if these are worn
- it is repaired or replaced when it becomes worn out.

Pockets are not essential.

Cigarettes, or foods of any kind, should not be carried in overall pockets, unless in tins with tight lids.

### 2. HEAD AND NECK

If the overall covers 85% of the skin, the next most exposed area is the head and neck.

If the overall does not button up to the neck, a scarf should be worn.

If any spray or dust is liable to land on the head, a wide brimmed hat should be worn.

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### 3. LOWER LEGS AND FEET

Pesticide can be absorbed through the skin of the lower legs and feet, especially as these are often wet by a spray or by sprayed vegetation.

The best protection is rubber boots.

Wear overalls outside the boots.

After work, wash the boots inside and out and leave upside down to dry.

If boots are not available, shoes can be used if they are in good condition and the overall reaches right down to the top of the shoes. Sandals should not be worn.

### 4. HANDS

Hands must be protected particularly by those handling concentrated pesticides - baggers and mixers.

Gloves should be in good condition, waterproof and without holes. They should have a length 2-3" below the elbow and should be worn outside the shirt sleeves so that any liquid does not wet the shirt.

They should be washed before removing. After removing soak in solution of washing soda for one hour. Then wash them inside and out. Put on a peg, fingers uppermost to dry.

### 5. RESPIRATOR

1. Protection from inhalation of spray mist or dust is necessary if a highly toxic pesticide is being used, and desirable if other pesticides are used.

A clean cloth over mouth and nose can be used, so long as cloth does not become wet.

- 
2. If highly toxic pesticides are used, a respirator containing a cartridge is necessary.

The respirator must be:

- well fitting around the nose
- worn whenever spraying or dusting
- put down in a clean place when not in use or kept in a clean plastic bag
- washed daily and hung up to dry
- replaced if it becomes loose, worn or torn.

The cartridge must be changed daily or more often if breathing becomes difficult, particularly due to dust.

The cartridge should be destroyed after use and are good only for intermittent exposure. With continued use the absorbent layer becomes ineffective.

## 6. EYE PROTECTION - VISOR

Eye protection is needed for:

- spraying high crops
- mixing and bagging **highly toxic** pesticides.

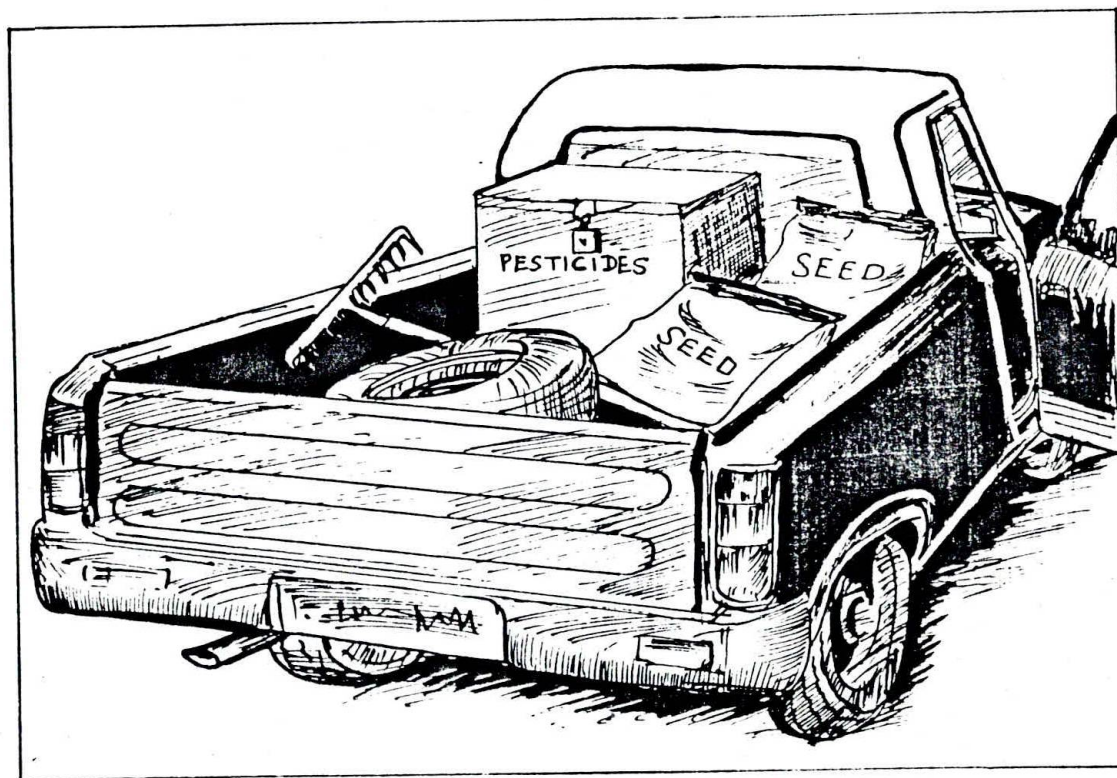
A visor of clear plastic can be used, with a headframe or attached to hat.

### *Visors*

- may need to be wiped occasionally with a clean soft rag
- should be put down carefully to avoid scratching
- should be washed as often as possible
- should be replaced when scratched or cracked.

## 7. WASHING PROTECTIVE EQUIPMENT

Washing of clothing and equipment daily is important.  
Use clean water to wash and then more clean water to rinse.  
Spread out or hang things to dry.  
Dispose of washing water carefully as it contains pesticides.



Pesticides should be carried in a separate locked container.

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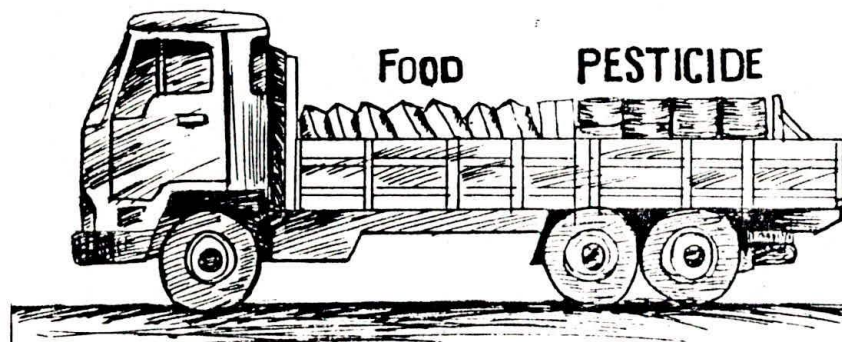
## PROTECTION OF OTHERS

### 1. CARRIAGE BY TRUCK

1. Those concerned in using pesticides must protect other people - the young and the old and other people's property, especially chickens, ducks and other animals.
2. Never carry pesticides in the same truck with food, especially food as flour, sugar etc. Many people have been killed by eating food contaminated with pesticides in this way.

Any pesticide spillage in a truck should be cleaned up with lots of water which is allowed to drain into a pit.

1. Open type truck should be used but ensure that goods are protected against rain
2. Do not place packings under heavy loads of others items.
3. Do not use hooks in loading bags
4. Clean vehicle after unloading.



Never carry food stuffs and pesticides together.



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## 2. CARRIAGE BY BOAT

Never carry pesticides with food in the same boat

If pesticides are carried regularly in a small boat, always put them in the same place, and never put food in this place.

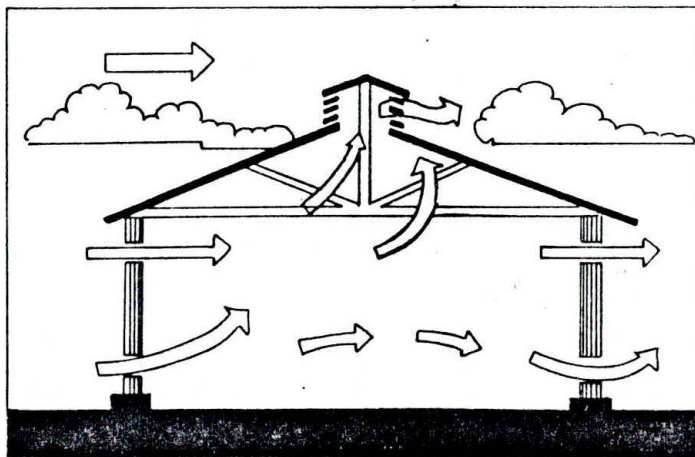
Otherwise scrub and wash the place where pesticides have been carried with plenty of water. If there are any signs of spillage, ask (a health worker) how to decontaminate the area. Avoid contaminating small streams.

## 3. STORE

All pesticides are dangerous in large quantities and must be kept in a safe place, away from children and from anyone else who might steal or misuse them.

All pesticide depots must have a good safe storehouse that can be closed off to prevent unwanted entry.

All pesticides must be stored in clearly labelled containers. Often the original container is the best.



Warehouses should be well-ventilated

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#### 4. LOCK ON STORE

All pesticide storehouses need a strong lock on the door.

The person who holds the key may often also be the person who keeps records of the pesticides that arrive and leave the storehouse - (and making sure that older pesticides are used first)

- Storehouse should be
- 1) away from populated area
  - 2) on well drained land
  - 3) located away from domestic water supply.
  - 4) made of non-combustible material
  - 5) having impervious floor
  - 6) well ventilated
  - 7) emergency exits must be available.



Stores should be locked securely.

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## 5. PUBLIC HEALTH: GOODS OUTSIDE HUT

When spraying the inside of a house make sure that all food, cooking pots and bedding are brought outside.

When spraying eaves, make sure that spray does not drift on to household goods stacked outside a house, or on to any food.

### TOXICOVIGILANCE

Patterns of poisoning should be reported to proper authorities, for example:

Careless Storage in the Home

Careless Handling in Stores/Distribution

Exposures through Poor Field Application Procedures

Excessive Food Residues

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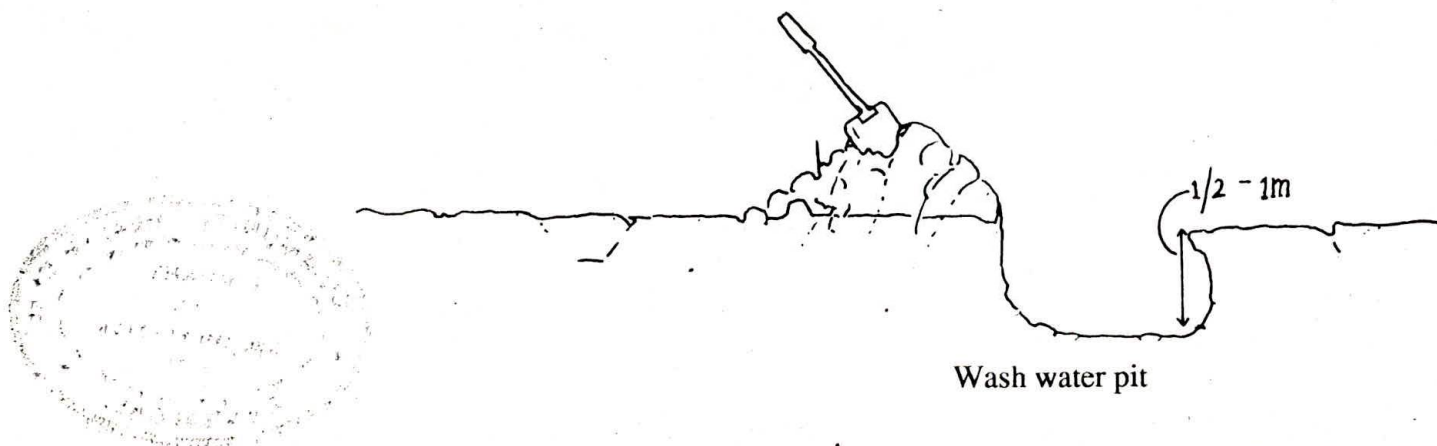
## SECTION V: ENVIRONMENTAL PROTECTION

### 1. DISPOSAL OF WASH WATER PIT

1. It is important that the pesticide should be used where it is needed and that it should not contaminate the surroundings elsewhere. This is particularly to protect children, birds and useful animals.
2. The picture shows a hole 1/2-1 metre deep, but not so deep that it has filled with water.

In this hole are poured:

- water in which hands have been washed
  - water in which pumps have been washed
  - water in which working clothes have been washed
  - water used to clean spills.
3. The hole should be
    - more than 100 metres away from streams, wells or houses
    - dry before anything is poured into it
    - filled in as soon as most of the water has soaked away.



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## 2. DISPOSAL OF WASH WATER - IN PUMP

If there is shortage of water, or it is not possible to dig a dry hole, washings can be stored to use the next day to make up the pump charges, until it is all used up.

It is important that the supervisor should make sure that the water is not misused for drinking. He should mark the container and keep it closed and secure from use by any person who might not know what it was. Treat it as if it were pesticide.

## 3. DISPOSAL OF CONTAINERS - BURYING

Used pesticide containers must be collected and disposed off safely. They always contain some concentrated pesticide.

The best way is to dig a pit, crush the containers and bury them. The pit should follow the same rules as the pits for washing disposal, but will often need to be deeper. The top of the containers in the pit should be 1/2 metre below ground level.

I What are the other rules for siting a pit?

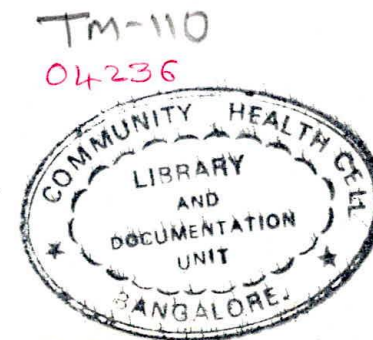
The rules are:

- 1) The burial site should be such that leakage of buried pesticide should not contaminate surface water or ponds.
- 2) water should be buried under minimum half a meter soil.
- 3) pit should not be dug in an area of low water table and pit should be dry at the time of burying containers.

II What clothing should the person burying containers wear?

Clothing for persons burying containers.

- i) overall
- ii) gloves
- iii) boots
- iv) cloth over mouth & nose





#### 4. DISPOSAL OF CONTAINERS - BURNING

If containers cannot be buried, they should be burned.

Warning- the smoke may contain poisonous fumes

The rules are:

- make fire in a shallow pit
- keep at least 100 metres away from any well, river, or house
- keep to the side where the smoke is blowing away from the person tending the fire.
- do not leave until all containers are burned.
- cover pit

What clothing should a person burning containers wear?

The person should wear

1. An overall & fire resistant clothing. Nylon and other synthetic fabrics are prohibited to avoid fire hazard.
2. Loose clothing should also be avoided to prevent fire hazard.
3. Face should be covered over mouth and nose with clean cloth or a respirator.
4. Boots and gloves are also essential.