

NOTE:

For more information, please contact;

Head Office:

The Managing Director/Secretary

Pest Control Products Board

Waiyaki Way, Opposite ABC Place

P. O. Box 13794 - 00800 Nairobi, Kenya.

Tel. 254-02-4446115/4450242

Mobile: 0720480904/0735778743

Fax: 254-020-4449072

Email: pcpboard@todays.co.ke /
md@pcpb.or.ke

Website: www.pcpb.or.ke

Mombasa Regional Office:

The Regional Manager

P.O. Box 10636-80101

Bamburi-Mombasa, Kenya.

Tel: 254-041-5487077

Fax: 254-041-5485794

Email: coast.region@pcpb.or.ke



PEST CONTROL PRODUCTS BOARD

[A Statutory Organization of the Kenya Government]

**GUIDELINES FOR ON-FARM DISPOSAL OF
PESTICIDE WASTES AND CONTAINERS**



VISION

To be the leading regulatory agency for pest control products in the region.

MISSION

To provide an efficient and effective regulatory service for the importation, exportation, manufacture distribution, transportation, sale, disposal and safe use of pest control products and mitigate potential harmful effects to the environment.

1.0 INTRODUCTION

These guidelines focus on on-farm disposal of pesticide wastes and containers. They provide information on what Kenyan farmers should do in the management of pesticide wastes on the farm including containers.

1.1 Sources of Waste

- Caking due to poor methods of storage.
- Unidentifiable products due to lack of label.
- Banned products.
- Expired products.
- Pesticide spillages and leakages.
- Contaminated items (soils, clothing e.t.c.).
- Rinsates from pesticides applicators.

2.0 AVOIDANCE OF PESTICIDE WASTES

A number of preventive steps can be taken to avoid the difficult problems and costly solutions of pesticide waste disposal. These include the judicious purchase, collection, transport, storage and use of pesticides.

2.1 Purchasing Pesticides

When Purchasing pesticides, the following precautions should be observed:

- ◆ Only purchase what you need: calculate carefully the amount needed and try to avoid being left with a surplus. For example, do not buy a large container if only a small portion of its contents is likely to be used by the end of the season.



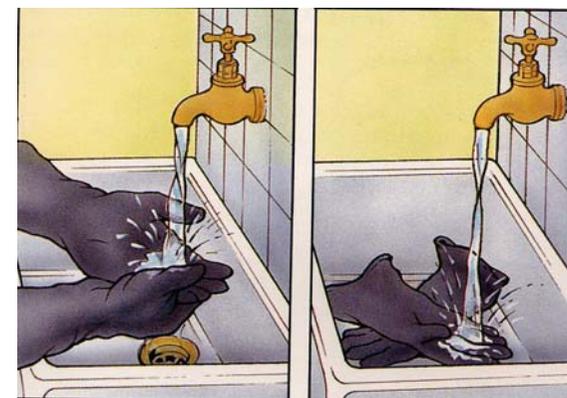
Choose pesticide pack sizes that suit a season's needs.

- ◆ Do not eat, drink, smoke, or go to the toilet with pesticide-contaminated hands. Always wash hands thoroughly after handling pesticides or waste.
- ◆ Wash contaminated skin immediately, preferably with soap and water.



Wash contaminated skin with plenty of water

- ◆ Where splashes of pesticide have entered the eyes, wash the eyes thoroughly with cool, clean water for at least 10 minutes.
- ◆ If severe skin contamination with a toxic product has occurred, or if such a product has been inhaled or swallowed, give immediate first-aid and seek medical assistance at once. Provide the doctor with the label from the pack which contained the product.



Cleaning after handling pesticide wastes

4.1.2 Incinerator Management

- ◆ The main requirements of incineration, are that a fire should not cause a "nuisance" or create "dark smoke".
- ◆ Burn wooden/paper or carton packaging containers regularly on a little and often basis.
- ◆ Burn in or near the field of work although a dedicated site on the farm is more suitable.
- ◆ Site the incinerator away from roads, livestock, domestic houses, farm buildings, hedgerows, watercourses and wildlife areas.
- ◆ Ensure incinerators are not near to any combustible materials such as wood, straw, fertiliser and the material to be burnt.
- ◆ Place incinerators on a firm level surface, preferably a concrete slab, which drains into the disposal pit.
- ◆ Site the incinerator near the disposal pit, so that ashes can be easily disposed.
- ◆ Keep a bucket of water/water carrier close at hand.
- ◆ Best weather conditions are clear calm weather with low wind speeds. Avoid incineration in high winds or in cloudy or overcast weather.

5.0 HYGIENE AND SAFETY PRECAUTIONS

During all operations involving the handling of pesticides and pesticide waste, the safety precautions on labels and in the manufacturers' or suppliers' literature must be observed.

Therefore: **ALWAYS READ AND OBEY THE LABEL INSTRUCTIONS CONCERNING HYGIENE AND SAFETY PRECAUTIONS.**

In particular:

- ◆ Always wear the recommended protective clothing and equipment.



Protective clothing for safe handling of pesticide waste

- ◆ Choose suitable container sizes: avoid large containers and do not buy large containers if handling facilities on the farm cannot cope.
- ◆ Do not accept damaged containers: examine all containers to ensure that they are not leaking or badly dented and that caps and seals are intact.
- ◆ Do not accept inadequately labelled containers: make sure that the labels can be easily read.

2.2 Transporting Pesticides



Refuse to accept badly damaged or inadequately labelled packages.

DO NOT TRANSPORT PESTICIDES NEAR PEOPLE, THEIR BELONGINGS OR FOOD

Where farmers have to collect pesticides from distributors such as retailers, the following guidelines should be followed:

- ◆ Seal small containers in plastic bags: as an added precaution, any small containers should be sealed inside a strong plastic bag.
- ◆ Do not carry pesticides inside the passenger compartment: pesticides should be placed on the back of the truck or boot of a car, in an outside container, or in a trailer.
- ◆ Inform drivers: drivers collecting pesticides must understand the danger of pesticides, what the containers hold and what to do in the case of an emergency.
- ◆ Care in loading and unloading: special care must be taken during loading and unloading to prevent container damage and spills. Do not push containers off the back of the vehicle. Load in a controlled way - forklift truck, hoist or suitable ramp, such as planks and old tyres to stop containers at the ground.



Do not push heavy packages off the backs of lorries.



Heavy packs must be properly controlled.

- ◆ Intact carrying surface: the vehicle transporting the pesticides must have a well maintained carrying surface which does not have protruding nails, metal strips or wood splinters which can damage containers.
- ◆ proper stacking: always load containers the correct way up, so that leaks from lids or tops do not occur; ensure fragile packages are not crushed.
- ◆ Secure loads: ensure containers are secured properly so that they do not move, roll about or fall off the transport vehicle.
- ◆ Do not load pesticides with food, feed stuffs or other materials destined for human use.
- ◆ Do not leave the vehicle unattended.
- ◆ Keep the load dry.
- ◆ Ensure the vehicle is soundly maintained, so to avoid breakdowns.

2.3 Action for Emergencies During Transportation

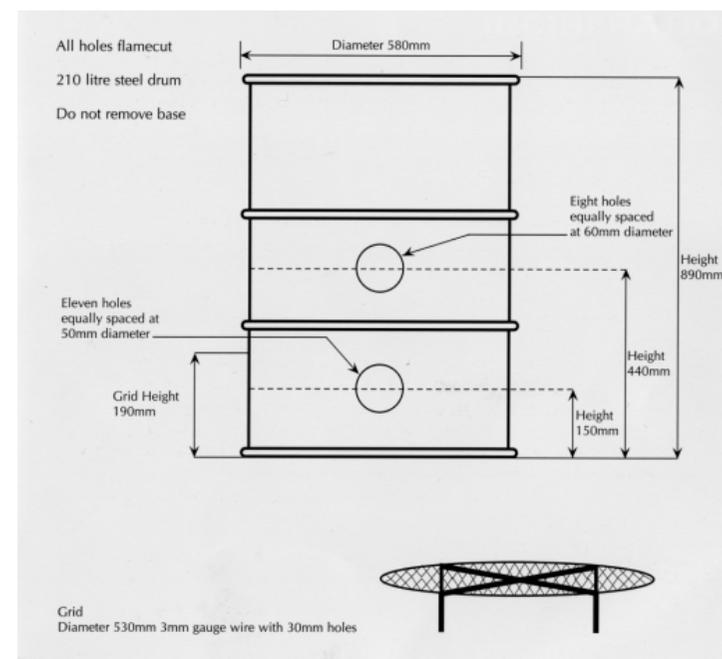
In the event of an accident, such as a crash, a fire, a spillage or movement of the load, carry out the following:

- ◆ Stop the vehicle and switch off the engine.
- ◆ Do not light cigarettes.
- ◆ Send someone to call emergency services such as police.
- ◆ Wear protective clothing.
- ◆ Contain any spillage by surrounding and covering with sand or soil to avoid contact risk and prevent fumes.
- ◆ Stay with the vehicle but remain upwind of the spill.
- ◆ Prevent people from coming too near the vehicle.
- ◆ Warn emergency services of the problem and allow them to take the necessary action.
- ◆ Spillages must be properly absorbed and then removed and disposed of in a safe place.

A useful on-farm incinerator, is the one based on a design which has been tested and found suitable for wooden and paper/carton packaging materials. This basically consists of a 200 litre drum, with holes of specific sizes cut into and around the circumference, placed on a stand off the ground.

4.1.1 Incineration

- ◆ It is critical that the incineration fire burns very hot. High temperatures cannot be achieved in an ordinary garden fire or bon fire. Therefore, do not burn waste in a open pit.
- ◆ Garden fires burn at 300°C to 500°C but mostly less than this, and produce a lot of smoke. Good incineration will burn at temperatures of between 800 and 950°C, produce little smoke and give a thorough combustion of all the materials with minimal ash and no mess.
- ◆ The gases produced from the fire are similar to those produced by burning pine wood and the remaining ash has no pesticide residues.
- ◆ The incinerator can be built on-farm or supplied by a local engineer. The particular configuration and size of holes is critical to the performance of the incinerator so farmers building their own should follow the design below.



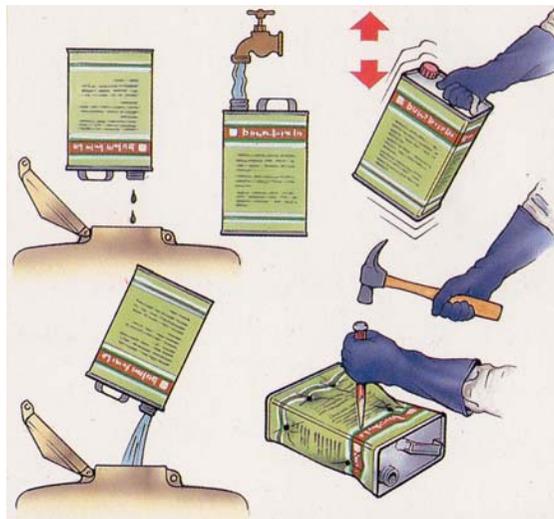
3.5.2 Container Disposal

- ◆ At the disposal site, containers must be punctured after rinsing to make them unusable, and crushed to reduce bulk.
- ◆ The most environmentally secure method for disposing of combustible packaging materials such as paper, cardboard and plastic is for them to be burnt in a LICENSED incinerator.
- ◆ If incineration is not possible, then all containers must be buried after being made unusable and reduced in bulk as much as possible.
- ◆ In burying, integrity of all containers must be destroyed so that they are rendered unusable: tear paper, shred plastic, crush glass, puncture and flatten cans and drums.
- ◆ Do not puncture aerosol cans.

4.0 METHODS OF DISPOSAL

4.1 On-Farm Incineration

The major disadvantages of using a licensed incinerator are those of cost of incineration, cost of transport and the danger and extra care needed in transporting the used containers to the incinerator. Therefore, where there is no licensed incinerator within reasonable distance and where the amount of waste for disposal is not excessive, then an on-farm incinerator can be used.



After use, containers must be drained, rinsed and made unusable

- ◆ Hard surfaces must be cleaned with lime, lye, detergent or soap powder. Any wash water must be contained and disposed of in a safe place. Do not allow contaminated water to run off into the environment.
- ◆ Powders can be swept up with sand and collected for disposal in a safe place.
- ◆ Destroy any food, feed stuffs or contaminated goods for human use.

VEHICLES TRANSPORTING PESTICIDES SHOULD CARRY SPILL EQUIPMENT: LIME-SAWDUST MIX, SAND, BROOM, SPADE, BUCKETS

2.4 Storage on the Farm

- ◆ Ensure the pesticide store is properly secured i.e. locked and out of reach of unauthorised people, children and animals.
- ◆ Keep food and feed stuffs well away from pesticides.
- ◆ The store should be well sited to minimise deterioration due to climatic conditions.
- ◆ The pesticide stocks should be properly managed - correctly placed, properly marked, upright, placed on intact shelves or pallets, appropriate height.
- ◆ Proper stock controls: orderly stock arrangement, segregation of different pesticide types, "first-in, first-out" stock control, controlled receiving and issuing of stocks.
- ◆ Regular store and stock inspections: checking if pesticide is still fit for use.
- ◆ No re-packing on the farm should be done except in emergency, because of the dangers associated with unsuitable packing material and inadequate labelling.
- ◆ Have emergency procedures for fires: avoid smoking; safe electrical systems; danger warning signs; fire fighting equipment - water, sand, fire extinguishers; equipment must have easy access; protective clothing; regular equipment checks.
- ◆ Have emergency procedures for spills and leaks: sawdust-lime mix, sand, broom, spade, buckets or strong plastic bags.
- ◆ Have emergency procedures and facilities for personnel contamination: protective clothing, showers.

2.5 Using Pesticides



When measuring or mixing powder products take care not to create a cloud of dust.

Waste and spillage of pesticides may occur during use because of:

2.5.1 Spills when measuring

- ◆ Special care during measuring and weighing pesticides is essential to avoid spillages. Pour liquids carefully. Take care not to create clouds of dust when working with powders.
- ◆ Use appropriate equipment for measuring and weighing pesticides. Do not use cracked measuring cylinders or jugs.
- ◆ Close pesticide containers properly after weighing and measuring and carefully return to appropriate place in the store.
- ◆ Have appropriate decanting equipment.
- ◆ Deal with spills and leaks immediately.

2.5.2 Spills when filling spray applicators

- ◆ Avoid using containers that are too heavy to handle safely, or have appropriate equipment to handle heavy containers.
- ◆ Fill sprayers from containers of manageable size.
- ◆ Use a funnel to pour concentrates into small sprayer apertures.
- ◆ Avoid sudden surges of liquids by holding containers in a manner that allows air to enter the containers freely.



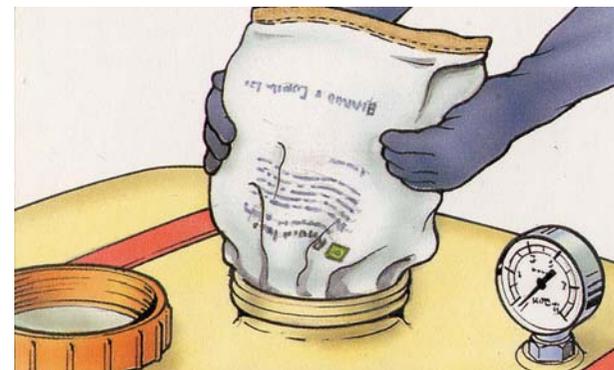
Pour liquid carefully to avoid spillages and splashes

3.5 Disposal of empty Containers and Packaging

PESTICIDE CONTAINERS AND PACKAGING MATERIALS MUST NEVER BE USED TO CONTAIN WATER, FOOD OR FEED STUFFS FOR HUMAN OR ANIMAL USE

3.5.1 Cleaning Containers

- ◆ Wear protective clothing.
- ◆ Avoid spillages and leaks and take care that the container does not become contaminated, otherwise this will require cleaning too.
- ◆ Containers and packages must be completely emptied before disposing.
 - i. Dry materials, such as powders and granules, must be shaken out thoroughly into the applicator tank or hopper. Ensure no pesticide is trapped in folds. See figure below:



Empty powder and granule containers by shaking them into mixing vessels or tanks.

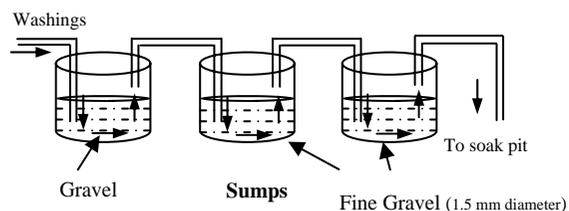
- ii. Liquids must be drained out of drums, cans and bottles by inverting the container over the mixing tank or sprayer tank and allowing it to drain for at least 30 seconds after the flow has slowed down to a drip; each container must then be rinsed **three times** by adding water until about 10% to 20% full, closing by replacing the cap, agitating by shaking, rolling or rotating to vigorously rinse all inside surfaces; then drain the rinse water into the mixing tank or sprayer tank; the cap must then be replaced. See figure below:
 - ◆ Take care to avoid splashing or creating dust.
 - ◆ Cleaned containers should then be placed in a dry secure compound prior to disposal.

3.4 Disposal of Diluted Pesticides and Sprayer Washings

3.4.1 Diluted Pesticides

Unused diluted pesticide remaining in a sprayer tank after spraying is complete is better known as contaminated aqueous waste. This can be disposed of in the following ways:

- ◆ Re-spraying part of the crop or area which has just been treated, **PROVIDED** this will not cause damage to the crop (or to a following crop) — as might be the case with certain residual weed killers — and will not leave excessive residues on edible crops. Note that if this is to be done, then the unused pesticide remaining in the sprayer tank must be further diluted with water tenfold and sprayed at double speed. This will only increase the dose rate by 5%.
- ◆ Alternatively, dilute tenfold as above and spray onto barrier areas around the crop or greenhouse or onto fallow land or land which is due to be cultivated, taking care not to put grazing animals at risk, nor put following crops at risk. Cultivated land provides the best conditions for biodegradation of pesticides.
- ◆ As a last resort, aqueous waste can be delivered in small amounts into a disposal pit.
- ◆ Where larger amounts of aqueous waste is to be disposed of, this may be done through an effluent treatment system as shown below:



The sumps should be lined with fine gravel (1.5mm diameter) in a series of at least three (3) before directing into soak pit, which must meet conditions of burial.

3.4.2 Cleaning Sprayers

Good sprayer cleaning is essential. It avoids risks to other crops sprayed and ensures the sprayer is ready for the next job. Washing also helps avoid blockages. The following procedure for washing sprayers is recommended:

- ◆ The best place to wash the sprayer is on a purpose built “wash down area”, consisting of: concrete slab with walls to prevent drift and bunds to prevent spills; Direct generated effluent to effluent treatment system described above.
- ◆ Small scale users may use unsprayed area for the cleaning but exercise care so that washings do not run off into water courses, drains and ditches.

- ◆ Avoid overfilling sprayer tanks when topping up with water.

2.5.3 Spills and Leakages from spraying equipment

- ◆ Avoid spills and leaks by having well maintained application equipment.
- ◆ Repairs of leaking spraying equipment should be attended to immediately.

2.5.4 Surplus Pesticide After Application

- ◆ Sprayers should be properly calibrated to avoid excess or insufficient spray mix being made up.
- ◆ Calculate the correct amount of mix necessary for the application, and measure accurately to avoid excess diluted pesticides.

3.0 GENERAL PRINCIPLES OF DISPOSAL

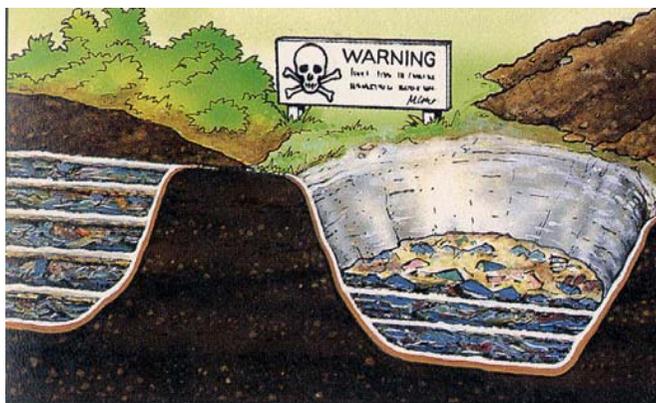
There are a number of general principles relating to pesticide disposal which must always be taken into account:

- ◆ Always dispose of wastes as and when they arise. Avoid accumulation of large quantities for disposal.
- ◆ Consult the product label for any specific advice.
- ◆ If in doubt, seek expert advice from the supplier or local Agricultural office or The Pest Control Products Board (PCPB) or the Agrochemical Association of Kenya (AAK).
- ◆ Always wear the protective clothing appropriate to the product when disposing of pesticide waste.
- ◆ Never dispose of pesticide waste in such a manner as to put at risk people, livestock, wildlife, crops and other plants, foodstuffs or water supplies.
- ◆ Never dump pesticides indiscriminately.

3.1 Disposal of Unwanted or Unused Pesticide Concentrates (Obsolete Stocks)

- ◆ An unused pesticide may be in good condition, and it could be used later. In this case it may be possible to return unopened and otherwise sound containers to the supplier for **resale**. Alternatively, a neighbouring farmer can use it. If not, and the container is unopened, ask the distributor if they can find users.
- ◆ Where unused concentrates cannot legally or safely be used, it will be necessary to ask the supplier if he will accept it for disposal.
- ◆ The unusable pesticide may be sent to a **LICENSED incinerator**, which can safely dispose of the pesticide by burning at a high temperature.

- ◆ In the event that there is no other option, and if the quantity is small, the unusable pesticide can be **buried**. Note that large quantities require specialized disposal. Consult the manufacturer or PCPB or AAK for advice.
- ◆ Burial to be done in a burial pit that meets the following:-
 - i. Subsoil to be used has low permeability to allow biological degradation of pesticide.
 - ii. Burial site should be away from water sources.
 - iii. Hole diameter should be 2-3 meters and 1-1.5 meters deep.
 - iv. The pit to be lined with clay 3-10 cm and coated with 2-3 cm lime.



Small quantities of waste may be buried on the farm.

3.2 Disposal of Waste from Spills and Leaks

Should there be a spill or leak, then the following apply:

- ◆ Protective clothing, such as gloves, boots and eye protection, as recommended on the product label, must be worn.
- ◆ Keep unauthorized persons, children and animals away from the affected area.



Keep unauthorised persons, children and animals away from the affected area.

- ◆ Prevent further waste by closing the container properly, or shifting its position to stop a leakage, or placing into another container.
- ◆ With dry waste, such as powders and granules, cover with dry sand or earth and sweep up and shovel into closable containers for safe disposal either through licensed incinerator or burial for smaller quantities. The use of damp sand or water may release toxic or inflammable gases from certain products.
- ◆ With liquid waste, use lime, sand, earth, or any other absorbent material to soak up the spillage. Shovel this into closable containers for disposal either by using licensed incinerator or burial for smaller quantities.
- ◆ Wash the contaminated spillage area thoroughly with water. Do not allow the wash water to run off into any water course, stream, well, borehole or dam. If necessary soak it up with more absorbent material to be disposed of.
- ◆ Make sure that all other containers near the spillage are thoroughly decontaminated by thorough washing. Dispose of the washings into appropriate disposal pit.

3.3 Disposal of contaminated clothing and Cleaning Materials

- ◆ Slightly contaminated clothing may be washed with detergent and several changes of water, separately from other clothing.
- ◆ Heavily contaminated articles and those which really cannot be decontaminated, such as protective clothing well soaked in pesticide, leather boots, or rags and cotton waste, which have been used for cleaning up spillages, must be burnt in a LICENSED **incinerator**, otherwise **buried**. Clothes must be torn or cut up before burial.