



Ministry of Agriculture and Livestock Development  
State Department for Crop Development  
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Emergency Locust Response Program  
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## Sustainable Agricultural Livelihood Restoration, Rehabilitation and Resilience in Kenya

### Training Manual

#### 2.3.4 SUB-MODULE 4: SAFE USE OF PESTICIDE

##### Introduction

Pesticides are hazardous and toxic to pests, humans and the environment. Therefore, Suitable and proper precautionary measures before, during and after pesticides use will guarantee safety of the ecosystem. Pesticides will cause adverse effects if intentionally or accidentally ingested, when they come in contact with the skin or inhaled. Other risks include contamination of drinking-water, food, soil and burning and/or scorching of plants. Special precautions must therefore be taken during transport, storage and handling. Spray equipment should be regularly cleaned and maintained to prevent leakage and spillage of pesticides. In general, all personnel working with pesticides should have proper training on safe use and first aid skills.

##### *Standard operating Procedures (SOP)*

**Creating awareness before control.** Pest and pesticide management are very important factors for safe agricultural products for human consumption as well as maintaining the natural environment. Pesticides used in the management of Desert Locusts in general is always of concern to the human health, wildlife and the environment, therefore, there is need for involvement of the surrounding communities in the control program through sensitization (community Baraza's and Meeting) and planning for the control operations. The approach will ensure total participation and compliance during desert locust control period while safeguarding other non-targeted organisms and the environment. There is a need for joint efforts by the Ministry of Agriculture and Livestock Development (MoA&LD) through the Plant Protection Services Division and other players in the management of desert locust.

**Transportation and Storage Pesticides.** Plant, Protection and Food Safety Directorate (PP&FSD) will be in charge of procurement, storage and transportation of pesticides for the management of trans boundary and migratory pests like desert locusts. Pesticide movement from the central store to the regional areas of control to be done by PP&FSD under the prescribed rules. This will ensure NEMA compliance through minimising and/ or eliminating exposure of hazardous chemicals to the environment and ecosystem during transportation and storage.

**Control operations.** For the control operation to be effective, efficient and adhere to the safety measures/standards to the environment, the following factors must be in place,

- Target pest
- The behaviour, biology and ecology of the pest will determine the type of chemical for use, the time, place and stage to institute the control and finally the threshold level to warrant the control.
- Selected Pesticide
- Toxicity level and effects to the environment, Targeted pest, efficiency and effectiveness of action, trade name, Registration number and manufacturer information.
- Control expertise and equipment
- Control and handling of pesticides to be done by qualified and trained personnel. Since desert locust information and management is controlled at the MoA&LD all the control operation for trans boundary pests, therefore, to be coordinated by the PP&FSD.
- Post-spray assessment
- The aim of post-assessment is to check on the efficacy of the Pesticide and the Impact on the surrounding environment. The information obtained to be used in making conclusion,



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recommendation or advice the subsequent decisions and policies for the country.

- Method of disposal of unused Pesticide and pesticide containers
- In a well-planned spraying operation the amount of pesticide solution required for the job should have been worked out carefully so that there is little or no pesticide left over.

Pesticides are poisonous and it is bad for the environment and dangerous to people and other animals when exposed. This means that preparing too much spray is a waste of money and effort because the pesticide will not be effective if it is used later. Therefore, an adequate amount needs to be prepared for a single operation program.

#### ***Disposal of Unused Pesticide***

If there is any pesticide left over at the end of a spraying operation then it is important that it be disposed off correctly. This means getting rid of the chemical so that it has no harmful effect on the environment, including people and their pets. If it is not possible to use up all the mixed pesticide and spraying is going to take place the next day then use any leftover pesticide on that job. However if no more spraying is planned then the following procedure will apply.

- Choose a place well away from community buildings and meeting/play areas, any streams, water supply areas, or low-lying areas where water may collect or there may be a high water table. Near the storage shed or at the soak pit may be appropriate.
- Dig a hole 50 cm deep.
- Cover the bottom of the pit with a 25 to 40 mm layer of hydrated lime.
- Pour the unwanted pesticide into the hole.
- Cover with soil.

#### ***Disposal of Empty Pesticide Containers***

- The lids of all containers should be removed before disposal.
- Glass or plastic containers must be buried deep in an isolated area away from water supplies. If it is safe to do so, it is a good idea to break glass containers before disposal. Plastic containers must be punched with holes so that they cannot be used to carry water.
- Glass or plastic pesticide containers which cannot be broken or punched with holes must never be left around in case people use them for some other purpose.
- Metal containers should be made unusable by punching holes in the top and bottom and then crushing it. Flattened containers are easier to bury or dispose of at the pit. Drum crushers for pesticide containers should be located at different regions.
- Never burn pesticide containers because they may give off poisonous gases. Never use these containers or any Pesticide treated materials, such as wood on fire. A summary of the Standard Operating procedures (SOPs) for safe use of pesticide in the control of Desert locusts is provided

#### ***Safety Measures for Handling Pesticide/Chemical***

Pesticide products can pose risk to humans, animals and the environment. Before choosing and purchasing a pesticide, it is important to read and understand the directions on the label. These information include:

- Brand or trade name.
- Type of pesticide.



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- Active, inert ingredients and formulation.
- Net content.
- Registration Number.
- Transportation and storage.
- Mode of action.
- Classification Number.
- Date of manufacture and expiry.
- Precautionary statement.
- Do not carry pesticides in a vehicle used to transport food.
- Pesticides in drums must be put on a cushioned surface in the vehicle during loading and before transportation to avoid friction.
- Pesticides must not be filled to the brim in the packaging containers to avoid spillage and leakage.
- Pesticides should never be kept in a place where they might be mistaken for food or drink.
- Pesticides and pesticide containers should be kept in a separate building or room or in an enclosed area
- Pesticide stores must be dry, well ventilated and under key and lock mode not accessible to unauthorised people or children.
- If pesticides are in drums or carton boxes, they should be put on pallets or raised above the ground surface.
- The storage area must be used exclusively for pesticides and empty pesticide containers.
- Outside storage area should have a strong fence, if the pesticide is stored in bulk.
- Spraying and Sprayer equipment.
- Determine the method of spraying.
- Choose the sprayer equipment for use.
- Calibrate the sprayer equipment to determine the efficiency and effectiveness.

The operator should wear protective clothing before spraying. These include:

- Gloves: to protect the hands and wrist
- Boots: it should be worn above the ankle-height and Made of unlined light -weight rubber. They should be washed inside and outside immediately after use or regularly.
- Overalls with wide trouser legs to be worn outside the boots to avoid drainage of pesticides into the boots.
- Goggles: to avoid chemical drifts to get into contact with the eye
- Head cover: for covering the head. Avoid head covers made from absorbent materials.
- Respirators with disposable cotton mesh to protect mouth and nose

During pesticide use:

- Use when necessary
- Use the right pesticide for the right pest at the recommended Mix (based on the label of manufacturer's manual).
- Wind direction and speed
- Do not spray in the opposite or against wind direction.



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- Always spray when the weather is calm, preferably, in the morning hours or evening hours.
- Operator/Equipment spraying speed
- Remove only the amount of pesticides needed for one's day operation.
- Fill the spraying equipment to the required level and ensure there are no leakage and spillage.
- Move at a constant speed as determined by the calibration and the spraying pattern.
- Keep the pesticide to its original container.

#### **After pesticide use**

- Chemical and the containers
- Empty any insecticide remaining in the spray tank back into the original pesticide container.
- Careful disposal of empty containers and surplus pesticides. The containers should never be used or converted for feeding or water troughs since they are hazardous to humans, animals and the environment. Therefore the responsibility of pesticide users continues until all empty pesticide containers and surplus pesticides are disposed of safely and properly.
- Sprayer Cleaned, greasing movable parts and tightening the loose nuts

#### **The operator**

- Wash protective clothing immediately after use.
- Drying the PPE under the sun in the open.
- Checking the torn parts of the protective gears and repairing them.
- Proper Washing of the body specially, hand, face and legs with soap and clean running water.
- Safe and proper disposal of the empty containers and surplus pesticides.
- Safe custody of the spraying equipment and other materials.
- Store
- Properly cleaned in case of chemical spillage and leakage.
- Ensure the room is well ventilated
- The principle rule is, the pesticide store to be always under key and lock mode

### ***Emergency Measures***

Poisonings are usually acute that results from extensive skin contact or ingestion. Signs and symptoms vary with the type of pesticide and can sometimes be confused with those of other illnesses or abnormalities.

Indications of pesticide poisoning include:

- General: Extreme weakness and fatigue.
- Skin: Irritation, burning sensation, excessive sweating, staining.
- Eyes: Itching, burning sensation, watering eyes, difficult or blurred vision, narrowed or widened pupils.
- Digestive system: Burning sensation in mouth and throat, excessive salivation, nausea, vomiting, abdominal pain, diarrhoea.
- Nervous system: Headaches, dizziness, confusion, restlessness, muscle twitching, staggering gait, slurred speech, fits unconsciousness.
- Respiratory system: Cough chest pain and tightness, difficulty with breathing and sneezing.



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Pesticide poisoning should be reported as first as possible and the first aid measures be given immediately to the victim before seeking medical advice and help at the earliest time possible. If the patient is within the proximity of the medical facility, s/he should be rushed immediately or call the ambulance and the doctor immediately. Ensure the pesticide container or the sample is also available to the doctor.

**First Aid Measures.** It is the initial assistance given to a victim while medical help is on the way. The first step is to call an ambulance or a doctor while ensuring that the victim is breathing and is not further exposed to pesticides.

**Pesticide on the Skin.** Wash the skin immediately with soap and water. If no water is available, wipe the skin gently with a piece of cloth or paper to soak up the pesticide. Avoid rubbing or scrubbing. Remove contaminated clothing immediately and wash underlying skin. Clean pesticides from the skin. Remove the patient from the contaminated area.

**Pesticide in the eye.** Wash the eyes thoroughly for about 10 minutes with clean water. Where eye irritation is severe, send the patient to a doctor.

**Inhaled Pesticide.** This may occur when working with pesticides as gaseous, vapour or dust in closed areas or atomized particles blown by wind. Remove patient from work and loosen clothing around throat and chest

**Ingested Pesticide.** People who have accidentally ingested pesticide must be treated by a doctor immediately. Meanwhile, keep the patient calm and comfortable and protect him from heat and cold.

If breathing has stopped:

- Give artificial respiration. If no insecticide has been swallowed, mouth-to-mouth resuscitation may be given.
- Pull the patient's chin up and tilt the head back with one hand to keep the airway clear. Place the other hand on the patient's forehead, with the thumb and index finger toward the nose.
- Pinch together the patient's nostrils with the thumb and index finger to prevent air from escaping.
- Take a deep breath, and then form a tight seal with your mouth over and around the patient's mouth.
- Blow four quick, full breaths in first without allowing the lungs to deflate fully.
- Watch the patient's chest while inflating the lungs. If adequate respiration is taking place, the chest should rise and fall.
- Remove your mouth and allow the patient to breathe out.
- Take another deep breath, form a tight seal around the patient's mouth, and blow into the mouth again.
- Repeat this procedure 10–12 times a minute (once every five seconds).

**General Care for the Patient.** Make the patient lie down and rest because poisoning with organophosphorus and carbamate compounds is made worse by movement. Place the patient on her or his side with the head lower than the body. If the patient is unconscious, pull the chin forward and the head back to ensure a clear airway. Cover the patient with a blanket if he or she feels cold, and cool the patient by sponging with cold water if excessive sweating occurs. If the patient vomits spontaneously, ensure that he or she does not inhale the vomit. In the event of convulsions, put padded material between the teeth to avoid injury.





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#### **Further reading**

FAO. (2014). Food and Agriculture Organisation. Evaluation of field trials data on the efficacy and selectivity of insecticides on locusts and grasshoppers. Report to FAO by the Pesticide Referee Group, 10th meeting. Gammarth, Tunisia.

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