PESTICIDE HEALTH RISKS FOR SOUTH AFRICAN EMERGING FARMERS

Compiled by Hanna-Andrea Rother and Ricado Jacobs
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Hanna-Andrea Rother 1 and Ricado Jacobs 2

For the Surplus People Project
Cape Town

1 Dr. Rother is a Senior Researcher at the University of Cape Town in the Occupational and Environmental Health Research Unit (OEHRU) in the School of Public Health and Family Medicine.
2 Ricado Jacobs is the Research, Information and Advocacy Manager at the Surplus People Project (SPP).

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P.O. Box 468
Athlone 7760, South Africa
Tel: +27 21 448 5605
Fax: +27 21 448 0105
Email: spp@spp.org.za
Website: www.spp.org.za

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INTRODUCTION

This booklet is designed for small-scale/emerging farmers in South Africa in order to raise awareness about the health implications of exposures to pesticides. Farmers use a variety of pesticides to protect their crops from pests and diseases, as well as to promote growth and productivity. However, exposures to these pesticides can cause immediate and/or long-term health effects. Pesticides not only can cause harm to the person using them, but also to others, the soil, water, “good” insects, and other plants. These various harms, both in the short and long term, will have costs for farmers from lost working time, medical expenses, and limited productivity.

The information in this booklet is meant to help farmers identify the dangers of exposures to harmful pesticides and to assist in enhancing exposure protection by providing much needed information. Access to information for farmers is limited. The risk information on pesticide labels is complex and difficult for farmers to understand and apply.

We hope that the information in this booklet will assist small-scale farmers to protect themselves, others (especially children) and the environment from the negative effects associated with pesticide use and exposures. Remember – never use a product before you know what the risks are. Read the label or find someone who can read the label for you. Do not use products for which there is no label. Also, always check first if there is a less-toxic/hazardous alternative available to control the pest problem you are having.

Agriculture which relies on chemicals for pest control has negatively impacted on our environment, biodiversity and the health of farmers. The booklet promotes sustainable agriculture as an approach and practice suitable for small-scale farmers. Agro-ecology, the foundation of a sustainable agricultural approach, incorporates an environmentally, economic and socially sensitive approach to agriculture. It is hoped that the information contained in the booklet will stimulate farmers to exercise their right to food sovereignty. This is, the right of farmers and others to produce food that is healthy and culturally relevant through sustainable and sound agricultural production.

Use the resources section at the end of this booklet for alternatives, and more information on pesticides and pesticide health effects.

WHAT ARE PESTICIDES?

“Pesticides” are different types of chemicals used to kill pests (e.g., insects, moulds, rats, snails, weeds) in order to minimize their impact on agriculture, health and other human interests. For example, insecticides are chemicals used to destroy unwanted insects; fungicides are chemicals that destroy moulds; herbicides are chemicals used to kill weeds or unwanted grasses; and rodenticides are chemicals used to kill rats and mice. All pesticides are toxic as they are meant to kill/destroy the pest. However, the pesticide does not know what or who is the pest and what or who is not. Therefore, pesticides can harm humans, plants, water, soil and “good” insects that are not the pest.

Not all pesticides kill in the same way. Pesticides kill by disrupting or interfering with some vital function of the pest needed for it to survive. This is called the pesticide’s mode of action. For example, the mode of action of many insecticides is interfering with the insect’s nervous system. It is important to know a pesticide’s mode of action, as this is the same way in which human’s could be harmed by pesticides. Therefore, pesticides can be very dangerous to humans.

Pesticide formulations are made up of the active ingredient and inerts. Active ingredients prevent, destroy, repel, or mitigate any pest and are from one of the following pesticide classes: Organophosphates, Organochlorines, Carbamates, Organobromides, Inorganics, Phenox herbicides, Insect Growth Regulators, and Pyrethroids. Inerts are any pesticide ingredients other than an active ingredient. They are used as solvents, surfactants, diluents, carriers, catalysts, synergists, intensifiers, and more than 30 other uses. Some inerts are also toxic.
Risks Associated With Exposures to Pesticides

Pesticides can cause quick immediate (acute) or slow in the future (chronic) health effects. Some acute effects might be:

**Damage to the nerves**
- Headache, dizziness and weakness
- Tremors
- A lot of spittle developing, sweating, tearing of eyes
- Blurred vision
- Nausea and vomiting
- Tingling fingers
- Numbness
- Convulsions

**Damage to the lungs**
- Difficulty breathing
- Lungs fill up with fluid
- Failure to breathe leading to death

**Damage to skin**
- Rashes

**Damage to eyes**
- Eye irritations

Chronic pesticide exposure is linked to increased risks of developing cancer and disorders such as Parkinson’s disease. Some chronic effects might be:
- Permanent eye damage
- Developing allergies and/or asthma
- Cancer (e.g., leukaemia, brain tumours)
- Effects on the immune system
- Birth defects
- Not able to have children
- Developmental problems in children
- Neurological diseases
- Lung, liver and kidney problems
- Parkinson’s disease

Some factors make people more susceptible to developing pesticide related diseases. These include:
- Children who are still developing/growing are very vulnerable to long term effects
- Drinking alcohol
- If the person has a liver disease
- Being undermourned for a long time
- Pregnant women
- Breast feeding women
- Occupation (e.g., farmers, pesticide applicators and mixers, green house workers)
- Women and men of child bearing age
- Elderly
- Individuals with allergies, asthma or other respiratory diseases
- Individuals who are HIV positive or have AIDS
- Individuals with TB
- Individuals who are chemically sensitive
- Individuals who are chronically ill
- Individuals with genetic variations that lead to increased susceptibility

How Are Farmers Exposed To Pesticides?

There are many ways in which farmers can be exposed to pesticides and their harmful effects:
- Chemicals used in the home to control for rats, cockroaches, ants, flies, bed bugs, etc.
- Chemicals used in agriculture – producing crops
- Food that you eat may have pesticide residues
- Pesticides in the water you drink

The four main ways that pesticides enter farmers’ bodies are through getting pesticides on the skin, drinking/swallowing pesticides, pesticide splashes getting in the eyes, and breathing in pesticides in the air.

How do pesticides enter the body?
- Through the skin (dermal)
- Through the mouth (oral)
- Through the lungs (respiratory)
- Through the eyes (ocular)
Some ways of being exposed are:
- Handling/mixing pesticides, especially if you are not using gloves, respirator, plastic coveralls, and boots
- When applying pesticides to fields, etc.
- Drinking contaminated water
- Eating food or soil that has pesticides on or in them
- Dipping animals in pesticides
- Wearing a dust mask rather than a respirator (may breath in pesticide if mask is wet)
- Wearing improper gloves (e.g., latex gloves do not provide protection)
- Breathing in pesticides fumes that we or others spray
- Touching crops, flowers, or other surfaces that have been sprayed
- Drinking water that has pesticides in them
- Walking barefoot on surfaces that have been sprayed
- Walking bare legged in wet fields where the pesticides get onto legs from wet plants
- Eating food that has pesticide residues in them
- Chemicals used in our homes
- Reusing pesticides containers, especially for storing water or food

Communicating Pesticide Risks

Legally sold pesticides in South Africa should be in their original container with a label and/or information insert on it. These labels not only give instructions of how to use/apply the pesticide, but contain risk and precautionary information, and how you can protect yourself. This information is communicated through hazard and precautionary statements, pictograms and colour codes found on the labels. The problem is that most people are unaware that labels contain this risk information. Also, labels are not always in the language of the user and the language may be too technical to understand.

Pictograms

Pictograms are small pictures found on the label which are telling you a message without using words. The problem is that pictograms are often misinterpreted and not clear as to what safety action should be taken. Below are examples of some pictograms. To get information on the meaning of all pictograms on pesticide labels, contact AVCASA (see Resources below).

<table>
<thead>
<tr>
<th>COMMON LABEL PICTOGRAMS</th>
<th>MEANING OF PICTOGRAMS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Very toxic, toxic</td>
</tr>
<tr>
<td></td>
<td>Harmful</td>
</tr>
<tr>
<td></td>
<td>Wear Gloves</td>
</tr>
<tr>
<td></td>
<td>Keep locked away and out of reach of children</td>
</tr>
<tr>
<td></td>
<td>Wash after use</td>
</tr>
<tr>
<td></td>
<td>Wear protection over nose and mouth</td>
</tr>
<tr>
<td></td>
<td>Wear boots</td>
</tr>
<tr>
<td></td>
<td>Dangerous/harmful to wildlife and birds</td>
</tr>
<tr>
<td></td>
<td>Wear eye protection</td>
</tr>
<tr>
<td></td>
<td>Expiry date</td>
</tr>
<tr>
<td></td>
<td>Not for aerial application</td>
</tr>
<tr>
<td></td>
<td>Wear respirator</td>
</tr>
<tr>
<td></td>
<td>Dangerous/harmful to fish - do not contaminate lakes, rivers, ponds or streams</td>
</tr>
<tr>
<td></td>
<td>Dangerous/harmful to livestock and poultry</td>
</tr>
<tr>
<td></td>
<td>Handling liquid concentrate</td>
</tr>
<tr>
<td></td>
<td>Handling dry concentrate</td>
</tr>
<tr>
<td></td>
<td>Application</td>
</tr>
</tbody>
</table>
Colour Codes

The various active ingredients of pesticides are put into four categories of how toxic it is. The World Health Organization gives these different categories numbers (e.g., Ia, Ib, II, III and IV) depending on the level of toxicity. In South Africa, these categories are presented on the pesticide label as a colour stripe or colour code at the bottom of the label. See the table below for the colours that indicate how hazardous pesticides are. Unfortunately most farm workers are unfamiliar with these colour codes. Always look for the colour code on the pesticide you wish to use. Check first if there is a less hazardous pesticide you can use. Remember: the colour does not mean that one product is better than another at killing pests. It just alerts you to how hazardous the pesticide is for you and others! If there are no colour codes on the pesticide DON'T USE IT!

Exposure Reduction

To avoid dangerous exposures to pesticides and potential health effects, learn and practice the following:

- First make sure that you have a pest problem that requires treatment. A few pests are not always a problem. Learn to identify your pests and how many pests are ok without treatment. Contact the ARC (see Resources) for advice on how to “scout” for pests.
- Remove pests by hand where possible.
- If you need to treat, first find out what alternatives to pesticides you can use such as products containing pyrethrum and rotenone. Contact the Agricultural Research Council (ARC), the Gaia Research Institute (see Resources), or Surplus People Project (see Resources).
- Non-chemical pest control measures should always be used first. These include: sanitation, irrigation, manual weeding, and pest removal.

If you do use pesticides, be sure to follow these tips:

**LABEL:**
- Read the label or get someone to read it to you before using any pesticide.
- Make sure you understand the health risks and precautions you need to take.
- Identify the colour code. How hazardous is the product you want to use? Can you protect yourself and others? If not, don’t use it.
- NEVER put pesticides in any other container than the one it came in and make sure the label is always on it.
- If you or someone else is poisoned, take the label with you and get medical help.

**PESTICIDES:**
- Only use the pesticide for what it says it will kill.
- Keep pesticides in their original containers with the label and tightly sealed.
- Do not mix pesticides, or use more than one at a time.
- Do not mix different pesticides together.
- Do not use things to mix the pesticide with that come from your kitchen or home and make sure you mark the tool you use with a danger sign.
- Mix pesticides away from water sources, children, and not in any place people live in.
- Store pesticides away from children, animals and water sources.
- Do NOT transport pesticides next to the driver or passengers.

**PPE:**
- Use personal protection equipment (PPE) properly when pesticide use is considered necessary.
- Make sure you are using the right PPE for that particular pesticide. For example, a red colour code on a label will require a respirator, not a dust mask to prevent getting sick.

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<table>
<thead>
<tr>
<th>RED LABEL</th>
<th>YELLOW LABEL</th>
<th>BLUE LABEL</th>
<th>GREEN LABEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class Ia (1a)</td>
<td>Class II (2)</td>
<td>Class III (3)</td>
<td>Class IV (4) or U (unclassified)</td>
</tr>
<tr>
<td>Extremely hazardous</td>
<td>Moderately hazardous</td>
<td>Slightly hazardous</td>
<td>Less hazardous</td>
</tr>
<tr>
<td>Second most toxic pesticide sold in SA.</td>
<td>Use with caution and use protection</td>
<td>Keep locked away. Store away from children, animals and food.</td>
<td></td>
</tr>
<tr>
<td>Most toxic pesticide sold in SA.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use all precautions</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

[Image: HA ROTHER]
APPLICATION:
- Use the correct equipment for applying pesticides and make sure it does not leak on you or the soil.
- DO NOT spray pesticides on a windy day.
- Drop a leaf to find out the wind direction and make sure you spray so that wind is hitting your back.
- Make sure when spraying pesticides that house windows are closed and no children, animals or water sources are near by and can be contaminated.
- Only apply pesticides early in the morning or in the late afternoon – never during the day, especially when it is hot. The pesticide can become more dangerous.
- Do not enter a sprayed field until all the plants and soil is no longer wet from pesticides.
- When using a pesticide can for spraying (e.g., Doom), cover your hand with a glove or plastic bag (throw the bag out after spraying where it won’t cause contamination) to avoid skin contact with poison. Use a mask to avoid breathing in the spray mist from the can.

AFTER USE:
- Wash body and equipment away from water sources and home every time after using pesticides.
- Wash pesticide clothes after each use.
- Do not wash pesticide contaminated clothes with non-pesticide clothes.
- NEVER pour pesticides or put empty containers down the drain or into the toilet or into storm water drains or into rivers, reservoirs or dams.
- Let everyone around you know when you are using pesticides so they can protect themselves.
- DO NOT REUSE PESTICIDE CONTAINERS.
- IT IS AGAINST THE LAW TO BURN OR BURY EMPTY PESTICIDE CONTAINERS. Burning can release toxic fumes and burying contaminates water source.
- TAKE TRIPLE RINSED CONTAINERS BACK TO WHERE YOU BOUGHT IT (see Annex B for how to triple rinse)

STORAGE:
- Store pesticides in a locked room that is not part of your home and make sure children or others cannot open the room or find the key.
- Do not leave pesticides, sprayers or containers lying around – lock these away.

Pesticides’ Chemical Compounds and Associated Health Effects

In order to prevent pesticide exposures and potential long-term health effects, it is important to know the symptoms from exposure to the various chemical compounds in pesticides commonly used by emerging farmers in South Africa. Listed below are the different kinds of chemicals together with their health effects and the symptoms thereafter. The symptoms make it easy to identify the disease that one might be having at a particular point in time.

A. INSECTICIDES

Pyrethroids

<table>
<thead>
<tr>
<th>CHEMICAL TRADE NAME</th>
<th>ACTIVE INGREDIENT</th>
<th>CHEMICAL GROUP</th>
<th>CLASSIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bulldock</td>
<td>Beta-cyfluthrin</td>
<td>Pyrethroid</td>
<td>Class II (2)</td>
</tr>
<tr>
<td>Decis</td>
<td>Deltamethrin</td>
<td>Pyrethroid</td>
<td>Class II (2)</td>
</tr>
<tr>
<td>Ripcord</td>
<td>Cypermethrin</td>
<td>Pyrethroid</td>
<td>Class II (2)</td>
</tr>
</tbody>
</table>

Potential Health Effects

1. Asthma (wheezing and tightness of the chest)
2. Hypersensitivity pneumonitis (an allergic reaction in the lungs which causes the lungs to stiffen and scar, so you become irreversibly short of breath)
3. Nervous irritability, tremors
4. Motor ataxia: (a disorder of the nerves which cause you to lose control of how your body moves)
5. Urinary incontinence
6. Enlargement of the liver and the bile duct in the liver

Symptoms

1. Stuffy nose and throat
2. Asthmatic wheezing
3. Tight chest and difficulty breathing
4. Swelling of oral & laryngeal (air passages to the lungs) and release of lots of mucous
5. Shock (anaphylaxis) in severe cases
6. Nervous irritability; tremors & difficulty walking and with movement if there was a massive exposure.
Organophosphates

Health Effects

1. Neurotoxicity (poison the nervous system)
2. Some are toxic to an unborn child’s development.
3. Some can cause allergic reactions.
4. Some can cause skin problems.

Symptoms

1. In acute poisoning:
   a. Headache, dizziness, weakness, inco-ordination, muscle twitching, tremor, nausea, abdominal cramps, diarrhoea and sweating are common early symptoms.
   b. Blurred or dark vision, confusion, chest tightness,
   c. Wheezing and productive cough and pulmonary oedema (water filling the lungs)
   d. Also a slowed heart beat, salivation and tearing
   e. Toxic psychosis with manic or bizarre behaviour resulting in misdiagnosis of acute alcoholism
2. In very severe acute poisoning cases,
   a. the lungs can fill with water resulting in failure to breathe properly (called respiratory depression) and this may be fatal
   b. the person can be incontinent, lose consciousness and suffer convulsions (fits).

Carbamates

Health Effects

1. Neurotoxicity (poison to the nervous system).
2. Affects the liver and kidneys.

Symptoms

1. Diarrhoea, nausea, vomiting, abdominal pain, profuse sweating, salivation, and blurred vision.
2. Dyspnoea (difficult breathing) tremor (sudden feeling of fear or excitement), muscle twitching, ataxia (loss of body control) and headache.
3. Severe poisoning may result in respiratory problems, pulmonary oedema (water filling the lungs), and resembling influenza and convulsions (anorexia).
4. Continuous exposure may cause protracted liaise, weakness and anorexia resembling influenza.
**B. HERBICIDES**

**Triazoles**

<table>
<thead>
<tr>
<th>CHEMICAL TRADE NAME</th>
<th>ACTIVE INGREDIENT</th>
<th>CHEMICAL GROUP</th>
<th>CLASSIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Folicur</td>
<td>Tebuconazole</td>
<td>Triazole</td>
<td>Class III (3)</td>
</tr>
</tbody>
</table>

**Health Effects and Symptoms**

1. Itching, redness and eczematoid dermatitis (rough, itching and bleeding skin).
2. Nasal stuffiness, hoarseness cough and pneumonitis.
3. Sensitivity
4. Large ingestion may cause nausea, vomiting and diarrhea.
5. Poisoning results in hypothermia (abnormal low body temperature) and ataxia (loss of body control).
6. Muscle weakness and/or ascending paralysis resulting in respiratory paralysis.

**Phosphonates**

<table>
<thead>
<tr>
<th>CHEMICAL TRADE NAME</th>
<th>ACTIVE INGREDIENT</th>
<th>CHEMICAL GROUP</th>
<th>CLASSIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Round Up</td>
<td>Glyphosate</td>
<td>Phosphonates</td>
<td>Class IV (4)</td>
</tr>
</tbody>
</table>

**Health Effects**

1. Irritation to skin, eyes and mucous membranes.
2. Lung oedema (water on the lungs).

**Symptoms**

1. Lethargy (lack of energy), diarrhea, weakness & collapse.
2. Nausea
3. Irritation in areas of contact
4. In severe cases, lungs can fill with water resulting in failure to breathe properly. This is due to the chemical added to Round-up (inert – that is, surfactant) to make sure it sticks to the plants.

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**C. FUNGICIDES**

**Dithiocarbamates**

<table>
<thead>
<tr>
<th>CHEMICAL TRADE NAME</th>
<th>ACTIVE INGREDIENT</th>
<th>CHEMICAL GROUP</th>
<th>CLASSIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dithane</td>
<td>Mancozeb</td>
<td>Dithiocarbamate</td>
<td>Class IV (4)</td>
</tr>
<tr>
<td>Milraz</td>
<td>Propines, Cymoxanil</td>
<td>Dithiocarbamate, Acetane</td>
<td>Class III (3)</td>
</tr>
</tbody>
</table>

**Health Effects and Symptoms**

1. Skin irritation and irritation of mucous membranes
2. Allergic reactions – skin rashes, asthma
3. Gastro-intestinal irritation manifesting as stomach upset or diarrhea
4. Toxicity to nervous system manifesting as peripheral neuropathy (damage to the nerves to the arms and legs, causing tingling feelings, impair sensation and difficulties with walking and holding objects) and psychotic reactions
5. Inducing “Antabuse” reactions in persons who take alcohol after exposure. Antabuse is a drug that is used to treat alcohol addiction. A person on antabuse will have a violent reaction after ingesting any alcohol. The drug is used to modify a person’s behaviour to get them to stop drinking. These pesticides mimic the effect of antabuse.
6. May cause damage to the part of the heart that cause it to beat regularly, so that it starts to beat very irregularly (cardiac arrhythmias). As a result, the person will get chest pain from inadequate blood supply to the heart (myocardial ischemia). It can go on to cause shock where the body fails to pump enough blood to the different organs which will lead quickly to death.

**Copper Compounds**

<table>
<thead>
<tr>
<th>CHEMICAL TRADE NAME</th>
<th>ACTIVE INGREDIENT</th>
<th>CHEMICAL GROUP</th>
<th>CLASSIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Koper-Chlor Koppersprey</td>
<td>Copper Oxychloride</td>
<td>Inorganic Copper Salt</td>
<td>Class III (3)</td>
</tr>
</tbody>
</table>

**Health Effects**

1. Skin and mucous membrane irritation
2. Damage to the nervous system and kidneys
4. Anemia
5. Ingestion of large amounts may cause gastro-intestinal irritation.

**Symptoms**

1. Skin rashes and burning eyes and throat
2. Gastro-intestinal irritation presents as nausea, vomiting, abdominal pain and diarrhea.
3. Sensitization may result in chronic skin irritation or eczema.
4. Kidney damage and anaemia will present as chronic tiredness and fatigue.
Sulphur Compounds

<table>
<thead>
<tr>
<th>CHEMICAL TRADE NAME</th>
<th>ACTIVE INGREDIENT</th>
<th>CHEMICAL GROUP</th>
<th>CLASSIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kumulus DF</td>
<td>Sulphur</td>
<td>Sulphide</td>
<td>Class IV (4)</td>
</tr>
</tbody>
</table>

Health Effects
1. Allergic reactions.

Symptoms
1. Can precipitate asthma and hay fever in people predisposed to these conditions.
2. Can cause skin irritation and burning of the eyes and throat.

Obsolete pesticides

An obsolete pesticide refers to the chemical product which can no longer be used as it is old and past its expiry date. Pesticides that have been banned, withdrawn or are no longer registered for use in South Africa are considered obsolete. Check Annex B for which pesticides are obsolete in South Africa and you MUST NOT use. There currently is a programme with the Department of Environmental Affairs and Tourism which is attempting to remove any stockpiles of obsolete pesticides farmers may have and to dispose of them.

Integrated Pest Management (IPM)

Integrated Pest Management (IPM) is an effective and environmentally sensitive approach to pest management that relies on a combination of practices where pesticides are used as the last resort to control pests. IPM protects humans and the environment from negative effects from pesticides. IPM is also a way for farmers to deal with “pesticide resistance”. Pesticide resistance is where the pest has developed the ability for the pesticide not to affect or kill it any more. Insects develop resistance to pesticides very quickly as they have so many generations of babies in one year.

IPM is not a single pest control method but, rather, a series of controls. In practicing IPM, farmers who are aware of a possible pest problem follow these four steps from the United States Environmental Protection Agency (USEPA) Factsheet (2007):

1. Set Action Thresholds

Before taking any pest control action, IPM first sets an action threshold, a point at which pest populations or environmental conditions indicate that pest control action must be taken. Sighting a single pest does not always mean control is needed. The level at which pests will become a threat to being able to produce the crop and make money is when a farmer needs to take action.

2. Monitor and Identify Pests

Not all pests (e.g., insects, weeds) require control. Many are actually doing no harm and some are even beneficial by killing pests you don’t want. IPM programs work to monitor for pests and identify them accurately, so that appropriate control decisions can be made. This monitoring and identification removes the possibility that pesticides will be used when they are not really needed or that the wrong kind of pesticide will be used.

3. Prevention

As a first line of pest control, IPM programs work to manage the crop or living place to prevent pests from becoming a threat. In an agricultural crop, this may mean using cultural methods, such as rotating between different crops, selecting pest-resistant varieties, and planting pest-free rootstock. These control methods can be very effective and cost-efficient and present little to no risk to people or the environment.

4. Control

Once monitoring, identification, and action thresholds indicate that pest control is required, and preventive methods are no longer effective or available, IPM programs then evaluate the best control method for effectiveness and limited health risks. Effective, less risky pest controls are chosen first. If further monitoring, identifications and action thresholds indicate that less risky controls are not working, then additional pest control methods would be used, such as targeted spraying of pesticides. Broadcast spraying of non-specific pesticides is a last resort.
Sustainable Agriculture – The Way for Small-Scale Farmers

Modern agriculture relying on the use of pesticides and synthetic fertilizers is contributing to the destruction of the environment, human health and economic stability of small-scale farmers. Sustainable agriculture is the alternative to agricultural practices which rely on pesticides.

Agro ecology is at the heart of sustainable agriculture which takes the whole farming environment into account (that is, the ecological system and agricultural system) where agricultural production operates in relation to the natural environment. It is the science of applying ecological concepts and principles to the design, development and management of sustainable agricultural systems. It takes local knowledge (past and present) and skills to implement a healthy, sustainable and productive system. There are a range of farming methods which all fall under the ambit of sustainable agriculture. These include:

Organic Farming

Organic farming is the practice of growing crops or animals without the use of any pesticides or synthetic fertilizers. This type of farming is becoming more and more popular as consumers want food without pesticide residues.

Agro Forestry

Agro forestry is the practice where trees are grown with other crops or animals as a means to control pests and have multiple uses of the agricultural eco system. Trees contribute towards increased biodiversity and pest control. Combining trees with crops and animals is also a critical factor to increase production. Trees and particularly intercropping also protect the soil from erosion.

Permaculture

Permaculture (coming from the words permanent agriculture) involves developing an agricultural system which imitates or duplicates the structure and interrelationship found in nature. It is a way of life that develops land use management to capture all aspects of a household/farming system.

Biodynamic Farming

Biodynamic farming, also falls within organic farming and refers to a method/practices that add plant, animal and mineral preparations to land. Its basic premise is to farm with the cycles of nature or in harmony with nature. This method makes use of land according to the rhythm of the sun and moon or lunar planting which further enhances the forces of nature.

Biological Control

Biological control is an alternative method to pesticides also used in IPM. This involves using natural enemies to control pests, for example insect predators or parasites of insects, birds, etc. This is a direct intervention as opposed to natural control.

Conclusion

Pesticides are dangerous to humans, animals and the environment – they are meant to kill and are indiscriminate as to who and what they kill or harm. As a farmer you need to learn as much as you can about the health effects associated with the pesticides you use, how to protect yourself and most of all to see whether you need to use them at all.

Hopefully, this booklet will help you to become more aware, know what to look for and to ask lots of questions. There are many alternatives to using pesticides which others or books can help you with. We recommend that you take a course on sustainable agriculture to learn how to apply this approach on your farm. By not using pesticides or using less, you will save a lot of money in the long run, especially by protecting your and your family’s health.
References


RESOURCE

Agricultural Research Council (ARC) – Plant Protection Research Institute. The research activities of PPRI focus on ecologically sound management strategies for agricultural pests, plant diseases and invasive plants, and promote the use of advantageous organisms to strengthen agricultural production in a sustainable way, through research, technology development and technology transfer. Telephone: 012 808 8000
Web: http://www.arc.agric.za

AVCASA – order responsible care book which explains how to read label pictograms and colour codes - Guidelines for the Responsible Use of Crop Protection and Animal Health Products

e-mail: info@avcasa.co.za · Web: www.avcasa.org

Occupational and Environmental Health Research Unit (OEHRU) at the University of Cape Town conducts research and training on health and safety issues related to pesticides and is involved in national and international pesticide policy related issues. The OEHRU also develops pesticide training manuals, posters, pamphlets and newsletters.
Telephone: 021 406 6578 · Fax: 021 406 6163
Web: http://www.oehru.uct.ac.za

Poison Information (24 hours)

- Red Cross Children’s Hospital Poison Information Centre: 021 689 5227
- Tygerberg Poison Information Centre: 021 931 6129
- Netcare Poison Centre: 0800 333 444 (free call)
- Gaia Research Institute. Stuart Thomson, P O Box 71, Wittedrif. Tel. 04457-9716
- Earthlife Africa. All numbers office hours. Cape Town 021-761 0928, Durban 031-942565, Johannesburg 011-839 3764, Pretoria 012-944 1916, Grahamstown 046-23778
- Poison Working Group. PO Box 15121, Lynn East, 0039. Tel. 012-808 0592

The Surplus People Project support local agrarian struggles of small-scale farmers, farm dwellers & movements through development support, popular education, participatory research and social mobilisation for sustainable livelihoods and food sovereignty.
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Annex A: Pesticides Banned, Withdrawn or Restricted for Use in South Africa as of January 2008


Arsenic. All uses of any inorganic arsenic containing compound on plant material (except on citrus) were banned in 1983. In 1988 it was also totally prohibited as a stock remedy.


BHC (mixture of various isomers). Banned in 1983.

Binapacryl. All registrations expired in 1988.


Chlordimeform. Withdrawn as an agricultural remedy in 1978.

Chlorobenzilate. Withdrawn as an agricultural remedy in 1978.

2,4-D (dimethylamine salt). In 1991 aerial application in Natal was banned and it has been totally prohibited in parts of the magisterial districts of Camperdown, Pietermaritzburg and Richmond.

2,4-D esters. In 1980 it was withdrawn from all agricultural uses in the Western Cape and prohibited in 1991 in Natal.

2,4-DB (sodium salt). In 1991 aerial application in Natal was banned and it has been totally prohibited in parts of the magisterial districts of Camperdown, Pietermaritzburg and Richmond.

2,4,5-T. All registrations expired in 1989.

DDT. Banned in 1983 except for the control of malaria by the Government.


Dinoseb. All registrations as an agricultural remedy expired in March 1995.


Endosulfan. Registration on fodder crops was suspended in 1970.


Gamma-BHC (lindane). All stock remedy registrations were withdrawn in 1971. All registrations under the Department of Agriculture to be withdrawn by April 2009.

Heptachlor. Registration was withdrawn in 1976.

Kepone. In 1971 a decision was taken not to allow this product in South Africa.

Leptophos. Registration was suspended in 1980.

MCPA (dimethylamine salt). In 1991 aerial application in Natal was banned and it has been totally prohibited in parts of the magisterial districts of Camperdown, Pietermaritzburg and Richmond.

MCPA (potassium salt). In 1991 aerial application in Natal was banned.

MCPB (sodium salt). In 1991 aerial application in Natal was banned.

Mercury compounds. It was withdrawn from all agricultural uses in 1974. In 1983 the use of all mercury compounds on seed, bulbs, tubers, stems or any other plant material was banned.

Methyl bromide. All small packages (680 g) were withdrawn in December 1995.

Monocrotophos. The use as leaf application on citrus, cutworm control in carrots and use on tomatoes were withdrawn in 1997. On 25 February 2005 all products containing monocrotophos approved by the Registrar was banned.


Nicotine. It was withdrawn from use as a stock remedy in 1971.

Parathion. Only certain uses allowed from June 1993.

Phosphorus containing formulations. In 1979 all formulations containing phosphorus were withdrawn.

Propham. Withdrawn as an agricultural remedy in 1997.

2,4,5-T. All registrations expired in 1989.

Triclopyr. In 1991 aerial application in Natal was banned.

TDE. Withdrawn as an agricultural remedy in 1970.
Annex B: Triple Rinsing Pesticide Containers

Triple-Rinsing means washing the container out with water three times.

Triple-rinsing can be used with plastic, non-pressurized metal, and glass containers.

**How to Triple-Rinse**
1. Remove cover from the container.
2. Empty the pesticide into the sprayer tank and let the container drain for 30 seconds.
3. Fill the container 10% to 20% full of water.
4. Secure the cover on the container.
5. Swirl the container to rinse all inside surfaces.
6. Remove cover from the container. Add the water and pesticide residue from the container to sprayer tank and let drain for 30 seconds or more.
7. Repeat steps 2 through 5 two more times.
8. Let containers dry and then put cover back on container.
9. Now take the container back to where you bought and NEVER USE IT FOR ANYTHING or you could poison yourself and others.

**Remember**
- To read and to follow all label instructions.
- To wear appropriate protective gear when working with pesticides and rinsing the container.
- Never to reuse a pesticide container for any purpose.
- To take the container back to where you bought it.
- Mixing, loading and rinsing sites should be at least 150 feet away from all water sources.

Source: [http://www.extension.umn.edu/distribution/cropsystems/DC3771.html](http://www.extension.umn.edu/distribution/cropsystems/DC3771.html)