**Pesticides**

Modern agriculture relies heavily on synthetic chemicals called **agrochemicals** that help to improve the production of crops and livestock. One group of these chemicals are pesticides. Pesticides are agrochemicals that are used to destroy pest and diseases that affect crops.

Pesticides helps to prevent the deformity of produce by pests or diseases. It is important to place agricultural chemicals in groups in order to better understand how they work. This process is called classification, classification is the systemic arrangement in groups or categories according to established criteria. Agricultural chemicals can be classified based on a number of criteria:

**The target organism**

**The way in which it is applied (liquid, powder, spray, gas)**

**The method of action**

Classification according to target organism- agrochemical are given different names depending on the organisms which are targeted

**Insecticides**-are chemicals which kill insects.

**Vermicides**- including nematicides and anthelmintics (wormers) kills nematodes and worms.

**Rodenticides**- kill rodents like rats and mice.

**Herbicides**- sometimes called weedicides kill weeds.

**Fungicides**- kill fungi.

**Bactericides**- kill bacteria.

**Method of action for agrochemicals**

Contact

Systemic

Selective

Non-selective

Pre-emergent

Post-emergent

Soil-borne

Residual

Stomach poison

Fumigants

Activity- describe how each works

**Safety precautions when using chemicals**

1. Use of PPE (Personal Protective Equipment)
2. Check all equipment
3. Choose a preparation area
4. Follow instruction on the label of the container
5. Decides how the work is going to be done.
6. Conduct training in application techniques ( how fast the person walks, what the chemicals is used to spray,
7. Measure chemicals accurately
8. If chemicals remains after spraying empty tank on a piece of ground away from food or water.
9. Rinse out with small amount of water.
10. Wash your hands, neck face as well as other body parts thoroughly after spraying, wash all PPE.

**Storage of Chemicals**

Proper storage of chemicals prevents people especially children and livestock from poisoning.

**Storage containers-** must be kept in their original containers with labels intact, Dispose of any unlabeled containers because you may not remember what was in it. Check regular for leaking.

**Storage areas-** Pesticides should be stored in a well-lit, well ventilated and fire resistant building or room. Children or animals should not be able to enter the room. Chemicals should not be stored with food or protective clothing, the floor of the room should be concrete which is easy to wash.

**Storage life of chemicals-**there should be records of purchase date on the container, most chemicals have a shelf-life of no more than 2 years. It is recommended to buy the exact amount of chemical you need to prevent expiration of same.

**Transportation of Chemicals**

When transporting agrochemicals in ant type of vehicle, you need to secure them to prevent spillage or loss due to sudden starts, stops and turns. Place them away from groceries, livestock feed or any products which could be contaminated. Also, any labelling that comes with chemical at purchase should be transported, there should be written record of chemicals transported, paper cardboard or water-soluble packages must be protected from rain or bad weather.

**Disposing of waste chemicals and containers**

Agrochemicals become a waste when they are no longer required, have expired or when the container is damaged. Some chemicals with change their state as a result of improper storage or age. The following should be observed when disposing waste.

* Do not dispose waste to cause harm to crops, livestock, humans or the environment.
* Waste should be disposed through a company licensed to handle waste disposal such as NSWMA (National Solid Waste Management Agency).
* Waste material and containers should not be piled
* The Ministry of Agriculture should be consulted before disposing waste.
* Containers with waste should be buried 1m below the surface and below level of any land drains. The area should be fenced or marked with warning signs.
* Records should be kept of the burial dates and the material buried.
* During burial of waste, PPE should be worn.
* If there is a charcoal site waste can be buried in the area.

**Safe periods for harvesting produce**

When you spray crops, the chemicals used leave residues for varying length of time, and this can harm someone who eats it. It is therefore important to know when your crop will be harvested so that you can time your chemical application.

The time period between the last pesticide application and harvest of the treated crop is called pre-harvest interval. In other words, this is the minimum number of days which must pass between spraying and harvesting. If the crop is harvested before that interval has elapsed, there could be dangerous levels of pesticide residues remaining in or on the harvested crop.

**Effects of agrochemical misuse**

Agrochemicals can be damaging to crops, livestock and the environment as such, if we are not following the safety guidelines in the correct use of the chemical these can happen.

* Spray drift from herbicides can damage nearby crops
* Spray drift can get into local waterways, which can kill aquatic life.
* When gardens are sprayed with insecticides bees and other pollinators can be killed
* Pesticides can kill the natural enemies of insect pests which will in turn increase the number of the insect pest.
* The use of agrochemicals can reduce biodiversity
* Agrochemicals can affect the food chain by killing living organisms (humans can also be affected)
* Non-target species can be killed.
* Many chemicals are persistent i.e. they stay in the water and soil for a long time

Activity:

1. State the safety measures that should be taken with agricultural chemicals to avoid the following:
2. injury and poisoning to the spray operator
3. Pollution of water courses and atmospheric conditions
4. The presence of chemicals residues on harvested agricultural products.
5. John mixed pesticides on a wooden floor and threw the empty container in the drain. What advice would you give to him? Explain why his actions were not sensible.