GENERAL CONTROL MEASURES AGAINST PESTS

The general principles of pest control are based on reducing the pests to such a low level of population that the loss incurred is minimal. Pest control measures take six (6) main forms:

1. Cultural
2. Biological
3. Chemical
4. Physical
5. Use of resistant varieties
6. Legal control

CULTURAL CONTROL: This consists of agronomic techniques used to reduce the incidence of pests. They include:

a. **Crop rotation**: By growing unrelated crops on a piece of land from year to year, pests are isolated from their food supply, thus leading to their death and reduction in their population.

b. **Tillage**: Deep tillage may expose soil-borne pests to dessication and some may be destroyed mechanically.

c. **Clean weeding**: weeds serve as alternative hosts to pests. So the removal of weeds and stubble before planting denies pests of places to hide.

d. **Timing**: The knowledge of the life cycle of a pest may enable a farmer to plant his crops and harvest early before the infective stage of the pest appears on the field.

Other cultural control measures include bush fallowing; burning; adequate spacing; correct seed rate etc.

Disadvantages of Cultural Control

a. Bush burning may lead to the destruction of soil texture, structure and some beneficial soil organisms like earthworm may also be killed.

b. Bad tillage operation may encourage erosion.

c. Bush burning may spread fire to other farmlands if not properly monitored.

BIOLOGICAL CONTROL: This is the introduction of other organisms called NATURAL ENEMIES which predate on the pests. It involves the direct use of living organisms to control pests. This method has been successfully used to control some insect pests. For example, the ladybird beetle (*Vedalia cardinalis*) has been used to control cushion scale insect. **African marigold (a plant) has been known to reduce the population of nematodes in the soil.** A

fungus, *Trichoderma virida*, is antagonistic to another fungus, *Rhizoctonia solani*, which causes diseases in tomatoes. So also, the ichneumon flies lay eggs on the soft bodies of caterpillars. The eggs hatch into larvae which are parasites that weaken and kill the caterpillars. The praying mantis also captures caterpillars and use them to feed its larvae.

Advantages

a. When successfully carried out, biological control lasts longer in controlling the pests.

b. Pest resistance is very unlikely.

c. It is environmentally and humanly safe.

d. It is pest-specific i.e. it attacks or targets or destroys a particular pest.

Disadvantages

a. The development of biological control is slower since it takes a longer time to produce sufficient predators to be used in the control.

b. The predator may attack the cultivated crops when its prey has been eliminated

c. If the predators are too many, they may begin to feed on both the beneficial and detrimental organisms.

d. It disrupts the balance of the ecosystem.

CHEMICAL CONTROL: This involves the use of chemical compounds called PESTICIDES to repel or kill pests.

Classes of Chemicals

1. Rodenticides: This is used to control rodents e.g. Rogor 40.

2. Avicides: used to control birds.

3. Nematicides: used to control nematodes like eelworms e.g. Nemagon, Vapan D.D, formalin etc.

4. Insecticides: used to control insect pests e.g. Carbonates, Pyrethroids, organochlorides etc.

Insecticides may be in the form of dust/powders, solutions, emulsions, fumigants, aerosols etc.

Modes of Entry of Insecticides into Insect pests

Insecticides kill insects in the form of:

a. **Stomach poisons**: this must be eaten/ingested by the insects. They kill the insects when they are absorbed into the digestive system. These types of insecticides are suitable for the

control of biting and chewing insects. Examples of stomach poisons are Dieldrin, diazinon, actellic dust, Lead arsenate etc.

b. **Contact poisons**: these are absorbed through the walls of the insect's body and therefore they must come in contact with the insects to kill them. They are suitable for the control of piercing and sucking insects. Examples are Malathion, Rogor, Nuvacron, Parathion, Cymbush, Cypermethrin.

c. **Systemic poisons**: these are absorbed by the plant parts and are extracted by the insects which feed on such plants. Systemic insecticides do no harm to the plants.

d. **Fumigants**: these release gas which enters through the tracheal systems of the insects. They are effective against insects of stored products and soil-borne insects. Examples include phostoxin, carbon disulphide, methyl bromide, lindane dust, sulphur oxide, hydrogen cyanide (HCN). Formalin and nemagon are nematicides used in soil fumigation.

Disadvantages of Chemical Control

1. The chemicals are toxic to man and animals and when present in high quantity, they can cause death.
2. Beneficial organisms like earthworms may be killed.
3. The chemicals pollute the environment.
4. Some chemicals may be carcinogenic (i.e. cancer-causing substances)
5. Pests may develop resistance to chemicals.
6. Some chemicals can cause water pollution.

Precautions to be taken while spraying Chemicals

1. Do not spray on a windy day.
2. Do not spray on a rainy day.
3. The operator should wear protective clothing like face mask, gloves, overalls and booths when spraying.
4. Do not spray in the hot weather, especially in the afternoon.
5. Do not spray near water bodies.
6. Follow the manufacturer's instructions/specifications.
7. Do not blow blocked nozzle with mouth when spraying.
8. Do not smoke, talk or eat when spraying.

PHYSICAL/MECHANICAL CONTROL: this is the control of pests by devices which physically destroy them or affect their physical environment adversely.

- ♣ **For birds**: scaring, shooting, use of recorded alarms, trapping, baiting and protective nets.
- ♣ **For rodents**: trapping, shooting, fencing, baiting.
- ♣ **For insects**: handpicking and crushing, use of storage structures and containers for grains.

USE OF RESISTANT VARIETIES: New varieties of crops may possess some genetic characteristics such as colour, taste, odour or certain chemicals which repel insects from consuming them. Varieties that can withstand insects attack by re-growing lost tissues are said to be TOLERANT.

Disadvantages/Problems

1. The resistance of the new varieties may not last long because both plants and pests are continuously adapting to their environment.
2. Plants which are resistant to certain species of pests are not necessarily resistant to other species which cause the same damage.

LEGAL CONTROL: These are laws or regulations made to prohibit/prevent, control and eradicate damages done to crops by pests and diseases. The most effective method of control of pests, diseases and weeds is to prevent their introduction (by legislation, if necessary) and to test all plants and animals coming into a country by Quarantine.

In quarantine operations, the law imposes a period of isolation and observation on all imported seeds, plants and animals (whether dead or alive), plant products, non-sterilised soils and any material with non-sterilised soils. These (isolation and observation) are done in sealed compartments for a period that is long enough for any disease symptom to show up or be detected. If symptoms appear, the materials are destroyed or sent back (re-exported) at the expense of the importer.