Unit 3

Tools and Equipment

171110CH03

Introduction

With the introduction of modern technology in agriculture, and innovative research and development of various machines and tools, flower cultivation has become easier and more profitable than in the past. A cultivator, usually, adopts mechanical farming due to several factors, like uncertainty of weather, unavailability of skilled labour and time constraints. Mechanised farming, thus, helps in completing tasks in less time, saves excessive cost of labour, and is available at all times. Various advanced tools and equipment are now in practice, which eases the cultivation of various crops.

Session 1: Implements used for Preparation of Land

Plough

Mouldboard plough

This is made of carbon steel or steel alloy, the base of which is at the right angle triangle. The size of the mouldboard plough is measured by the width of the furrow that is opened by the plough. Generally, it can

open a furrow of about 20 cm and above. It throws the furrow slices only on one side.

Disc plough

It consists of moving circular steel discs of varying sizes. The size of discs includes its diameter and thickness. Discs in different ploughs used are 50–90 cm in diameter. Discs cut, turn and break furrow slices. These can work well in sticky soil, as well as, in very hard and dry soil. It is much heavier and leaves the soil rough and cloddy.

Sub-soil single arm plough (*Patashi* plough)

This plough is useful for heavy soils. It consists of a single adjustable arm having shears at the base and breaks the hard pan developed below the soil surface. It improves drainage in water stagnant soils. It can be inserted up to 50 cm deep in the soil and is most suitable for making a trench of 5–7 cm wide.

Fig. 3.1: Disc harrows

Harrows

These are used for the preparation of finer soil by breaking clods, cutting weeds, pulverising the soil surface during field preparation. The harrows may be disc, spike, spring or blade types (Fig. 3.1).

Plank

It is a heavy wooden log, generally, used for compacting and levelling used for seed bed and field preparation for sowing the seeds. Planks are also used immediately after sowing the seeds to ensure proper covering of seeds with soil. It is also used for levelling the soil after ploughing.

Fig. 3.2: Cultivator

Cultivator

A cultivator is used to stir and loosen the soil, breaking the clods and destroying the weeds. The cultivator performs intermediary ploughing and harrowing. It also maintains a good tilth, adequate aeration, prevents run-off, and evaporation losses. Cultivators may be shovel, disc and blade types. Tine and spike cultivators are used to tilth the soil (Fig. 3.2).

Practical Exercises

Activity

Identify the implements used for land preparation

Material required: Practical notebook, pencil, pen, implements, etc.

Procedure

Write the following information

1. Identify different types of implement.
2. Write the names of the implements.
3. Describe the use of implements.
4. Draw a diagram and show the different parts of implements.

Check your Progress

Fill in the Blanks

1. The equipment used for turning over the soil or cutting furrows is called _____.
2. Mouldboard plough can open a furrow of about _____ cm and above.
3. _____ plough works well in sticky soil.
4. Sub-soil single arm plough can be inserted up to _____ cm deep in the soil.
5. Cultivator is an implement that performs _____ and _____.

Multiple Choice Questions

1. Cultivator helps to maintain good _____.
   (a) tillage (b) tilth
   (c) landscaping (d) fertility
2. An implement used for the preparation of finer soil by breaking clods is called _____.
   (a) harrow (b) plough
   (c) level board (d) rotavator
3. An implement used for levelling the field is called _____.
   (a) harrow (b) cultivator
   (c) rotavator (d) plank

Subjective Questions

1. Describe various types of implements used for field preparation.
2. Write in brief about the following:
   (i) Harrow
   (ii) Cultivator

Match the Columns

A	B
1. Mouldboard plough	(a) Disc and spike type
2. Plank	(b) Loosening the soil
3. Disc ploughs	(c) 50 cm deep
4. Single arm plough	(d) 50–90 cm in diameter
5. Cultivator	(e) Levelling
6. Harrowing	(f) 20 cm and above

Session 2: Other Tools and Equipment

For carrying out various horticultural operations, one needs different kinds of tools and equipment, such as hand cultivator, harrow, spade, secateurs, hand trowel, garden fork, sprinklers, rake, pruning saw, spray pumps, grass shear, budding and grafting knives, etc. These tools and equipment can be categorised as hand tools and power equipment. Hand tools are less expensive than power equipment, often serve multiple uses, and are easier to be used in small spaces. These tools and equipment help one to carry out day-to-day farm operations efficiently, easily, timely and economically.

Bill hook

Bill hook has single or double cutting edges. It is a hook-shaped tool consisting of a curved blade made of high carbon steel and manganese steel, attached to a wooden or plastic handle. It is commonly used for cutting big branches or to remove the old and dead branches from a tree (Fig. 3.3).

Fig. 3.3: Bill hook

Budding-cum-grafting knife

A budding-cum-grafting knife is a combination of two knives used for budding and grafting operation. It consists of two blades, one for budding and another for grafting. These blades are fixed to the ends of the handle. Both the blades are made from high carbon or alloy steel and are accommodated in one handle. Both the blades are foldable into the handle. The length of working blade may be 6.5–7.5 cm and width 1.5 cm (Fig. 3.4).

Fig. 3.4: Budding-cum-grafting knife

Slashing and pruning knives

Fig. 3.5: Pruning knife

These knives are used to remove unwanted twigs or branches of a plant or tree. Such a knife is made up of a tang joined rigidly to the handle and a blade. One end of the blade is hooked or curved in order to cut or slash the small branches or twigs of a plant by pulling action. The blade is made of high carbon or alloy steel. The handle is made of good quality wood or plastic (Fig. 3.5).

Secateurs

These are meant for cutting the branches, de-shooting, disbudding, cutting of scion sticks, defoliation of leaves from the sticks and topping off of small trees, etc. These are also useful in pruning off pencil thick branches and making of cuttings for propagation (Fig. 3.6).

Fig. 3.6: Secateur

Grass shear

Grass shear in various types are used for the maintenance of lawns. A grass shear is used for trimming and side dressing of the lawn. The important parts are cutting blades made of high carbon steel or alloy steel. The blades are sharpened at the cutting edges. The length of the blade varies from 15–20 cm (Fig. 3.7).

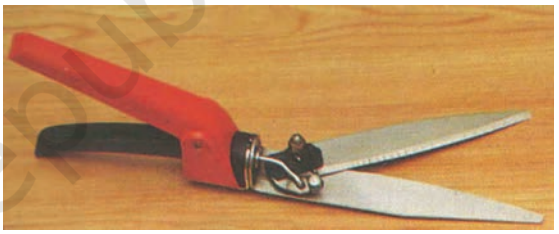

Fig. 3.7: Clipper or grass shear

Hedge shear

It is used for trimming, pruning and cutting of hedges and shrubs in the desired shape. It consists of two blades with tangs. The size of the shear is according to the size of the blades varying from 15–30 cm in length and 0.8 cm thickness (Fig. 3.8).

Fig. 3.8: Hedge shear

Spade

It is made up of cast iron and is used for digging or turning over the soil, making bunds in the field, and to prepare irrigation channels, etc. (Fig. 3.9).

Fig. 3.9: Spade

Fig. 3.10: Rakes

Rake

It is used for breaking the soil surface, removing stubbles, small stones and collecting weeds (Fig. 3.10).

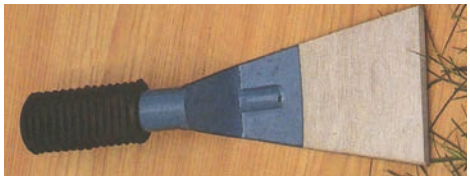

Fig. 3.11: Khurpi

Khurpi

It is made up of cast iron having a wooden handle on one side end. It is meant for weeding, lifting of seedlings and plants in the nursery, for transplanting the plants in pots and field, and for performing various other operations (Fig. 3.11).

Fig. 3.12: Sprayer

Sprayer

It is used for spraying insecticides, fungicides, herbicides, fertilisers and various other chemicals in the field. Different types of sprayers are available in the market as per the requirement (Fig. 3.12).

Fig. 3.13: Watering can

Watering can

It is used for watering seed beds, nursery beds and potted plants to avoid washing of the soil and damage to young seedlings (Fig. 3.13).

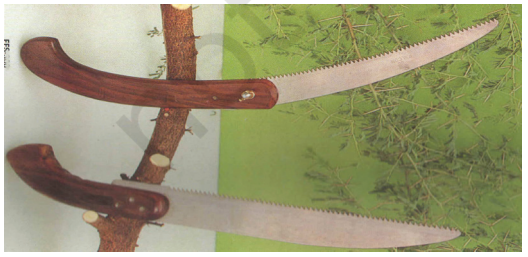

Fig. 3.14: Pruning saw

Pruning saw

It is used to cut thicker branches of plants (Fig. 3.14).

Fig. 3.15: Wheelbarrow

Wheelbarrow

It can be used to move heavy things from one place to another, and also to hold garden trash (Fig. 3.15).

Hand cultivator

It is used for altering and loosening the soil without damaging the roots in the garden nursery (Fig. 3.16).

Fig. 3.16: Hand cultivator

Tree pruner

It is used for pruning shoots of trees, which are beyond reach from the ground level (Fig. 3.17).

Flower scissor

A flower scissor is used for cutting the flowers with stems. It has two short blades with handles (Fig. 3.18).

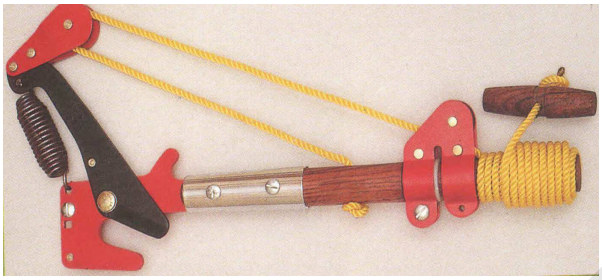

Fig. 3.17: Tree pruner

Fig. 3.18: Flower scissor

Precautions to be taken during the use of tools and equipment

(i) Keep all the tools and equipment out of the reach of children.
(ii) Handle them carefully and follow the instructions given in the manual provided with them.
(iii) If there is any accidental hazard, immediately contact the doctor.
(iv) It is essential to clean the equipment after use.
(v) During the spraying of insecticides, pesticides and fungicides, effective safety measures need to be taken.

Care and maintenance

(i) Ensure cleaning of equipment before and after use.
(ii) Store all machinery and equipment in a dry place.

(iii) Drain the tank and flush it with clean water, wash the pump nozzle before and after the use of sprayer.
(iv) Remove dust from the hopper of the duster and clean it with a cloth.
(v) Overhaul the machines regularly and replace the wornout parts. Grease and oil all moving parts of the machinery as per requirement.
(vi) Do not throw nozzles of sprayers and delivery tubes of dusters on the bare ground.
(vii) Always keep all spare parts in a tool kit.
(viii) Sharpen the blades of harrow, cultivators and cutters regularly.

Practical Exercises

Activity

Identify various garden tools

Materials required: Different types of tools, practical notebook, pencil, pen, etc.

Procedure

Visit a horticultural farm or shop to see different types of tools and equipment being used and note down the following information.

1. Identify different tools and equipment.
2. Write down the names of tools and equipment used.
3. Note down the specific use of each tool and equipment.
4. Draw the diagram of each equipment.

Check your Progress

Fill in the Blanks

1. The tool used for cutting and budding is known as _____.
2. _____ is used for making of cuttings, pruning off pencil thick branches.
3. The tool consisting of two blades with tangs is identified as _____.
4. Grass shears are used for _____ and _____ of the lawn.

Multiple Choice Questions

1. A tool used for making bunds and small plots in a field is called a _____.
   (a) rake (b) shovel
   (c) *khurpi* (d) spade
2. The tool used for collecting weeds and stones is called _____.
   (a) spade (b) rake
   (c) *khurpi* (d) shovel
3. Moving heavy things from one place to another is the function of a _____.
   (a) *khurpi* (b) hand hoe
   (c) wheelbarrow (d) shovel
4. Pruning shoots off trees, which are beyond reach from the ground level is done by a _____.
   (a) pruning saw (b) tree pruner
   (c) secateur (d) flower scissor

Subjective Questions

1. What precautions should be taken during and after the use of a tool or an equipment?
2. Write down the application and structure of the following:
   (a) crow bar
   (b) budding-cum-grafting knife
   (c) hedge shear
   (d) secateur

Match the Columns

A	B
1. Bill hook	(a) Cutting flowers with stems
2. Pruning knife	(b) Application of fungicides
3. Hedge shear	(c) Altering and loosening the soil
4. Secateur	(d) Side dressing of the lawn
5. Grass shear	(e) Making of cuttings
6. Hand cultivator	(f) Trimming, pruning and cutting
7. Sprayer	(g) Remove unwanted twigs or branches
8. Scissor	(h) Heavy pruning operations