

Unit

4



Garden Tools and Equipment

INTRODUCTION

A Gardener needs different kind of tools and equipment for carrying out various horticultural operations. In olden days, garden tools were made of bones, wood, stones and metals. However, with the advancement of science and technology, the use of metals like copper, steel and iron has led to the development of various kinds of garden tool and equipment like hand cultivator, tractor, lawn mower, harrow, spade, secateur, garden fork, sprinkler, rake, pruning saw, spray pump, grass shear, budding-cum-grafting knife, etc.

These tools and equipment can be categorised as 'hand tools' and 'power equipment'. Hand tools are less expensive than power equipment. They often serve multiple purposes, and are easier to use in small spaces. Power equipment require fuel, electricity or battery for functioning. They help make labour-intensive tasks easier. These tools and equipment, designed to perform different operations, help in carrying out day-to-day farm tasks efficiently, easily, timely and economically. These have revolutionised farming and gardening worldwide.



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Hence, it is necessary to choose the appropriate tool for performing a task effectively and timely.

TILLAGE

Tillage is the most important operation, in which physical manipulation of soil is done with tools and implements in order to obtain favourable conditions for plant growth. The harder surface soil is dug out to a certain depth, and the resulting big clods are broken down to make the soil fine, smooth and compact. This facilitates weed eradication, removes crop residues, helps in water infiltration, promotes aeration, and permits root penetration and development. Different operations, such as ploughing and levelling of field soil, harrowing, etc., are also performed under tillage operation. In soil, a tilth appears when it is soft, friable and aerated. All these activities involve the use of different tools and equipment. The selection of an equipment depends on its efficiency and size of the holding.

IMPLEMENTS USED FOR LAND PREPARATION

Ploughing is the initial operation that involves breaking of hard soil surface, uprooting previous crop residues and pulverising the soil. Different type of ploughs can be used for ploughing. Mouldboard, disc, rotary and sub-soil ploughs are some of the implements designed for breaking soil.

Mouldboard plough

It is made up of carbon steel or steel alloy, whose base is of a right-angle triangle. The size of a 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 may throw furrow slices only on one or two sides of the motion.

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. The thickness of the discs may be 2.5 cm at the cutting edge and up to 40 cm towards the centre. Some discs are 7.5 cm at the edge, which are thickened to 20 cm towards the centre. Discs cut, turn and break furrow slices. The plough can work in sticky, as well as, hard and dry soils. It cannot be used when the soil surface is covered with weeds and bushes.

Sub-soil single arm (*Patashi*) plough

This plough is useful for heavy soils and consists of a single adjustable arm, having shear at the base. It 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 to 7 cm wide.

Harrow

It is used for deep tillage of the soil by breaking up and smoothening the hard surface to provide a tilth of soil structure, which is suitable for the sowing of seeds. There are four kind of harrows viz., disc, tine (including spring-tooth), chain-disc and chain harrows.



Fig. 4.1: Disc harrow

Plank

Levelling of land and smoothening of the soil surface are the most important operations for sowing, planting and irrigation of crops. To perform these operations effectively and timely, different structures, such as level boards, *patela* or wooden plank are used. Levelling is, usually, done in two phases.

- While levelling higher sides, excess soil is dug out and spread over the lower areas to make the whole plot even.
- The second and more precise levelling is done after ploughing.

Cultivator

It is used to stir and loosen the soil, break clods and destroy weeds present the soil. Cultivator performs



Fig. 4.2: Cultivator

intermediary ploughing and harrowing. It also maintains tilth, aeration, prevents run-off and evaporation losses. Cultivators may be of shovel, disc and blade type. Tine and spike cultivators are used to bring the soil to fine tilth (Fig. 4.2).

Garden tools

Mower

A mower is used for cutting grass in lawns and fields. The discs or blades of the mower are made of high-carbon steel. These discs are mounted in spiral fashion on a centre shaft, which rotates at high speed and results in the cutting of field grass and weed plants. The rotating cutting blades, having spiral mounting, cause progressive cutting action across the anvil blade. The anvil blade is a flat blade sharpened at the edges and can be adjusted. In between the rotating sharp blades, grass and weed plants are trapped and cut due to shearing action. The machine also has front rollers for adjusting the height of the cut grass and a grass box at the rear to collect the cut grass while it is in operation. Rotating disc mowers are available with electric motors or are driven by engines.

Bill hook



Fig. 4.3: Bill hook

It is a hook-shaped implement having single or double cutting edge, consisting of a curved blade attached with a plastic or wooden handle. It has a blade made of high-carbon steel and manganese steel. The blade's length is 13 cm and width 2 cm. Bill hook is used for cutting shrubs and lopping old or dead branches of a tree. It is used for carrying out heavy pruning operations (Fig. 4.3).

Budding-cum-grafting knife



Fig. 4.4: Budding-cum-grafting knife

A budding-cum-grafting knife is a combination of two knives used for carrying out budding and grafting operations. It consists of two blades, one for carrying out budding and the other for

grafting. These knives are fixed to the ends of a handle. Both the knives are made of high-carbon or alloy steel. The knives are foldable into the handle. The length of the knife may be 6.5–7.5 cm and width 1.5 cm (Fig. 4.4).

Pruning or slashing knife

It is mostly used for removing unwanted and dense branches or twigs on plants. The knife made of carbon or alloy steel is tightly fit into the wooden or plastic handle. The tip of the knife is slightly hooked or curved for easy cutting or slashing small branches (Fig. 4.5).



Fig. 4.5: Pruning knife

Pruning shear

A pruning shear is meant for cutting branches, de-shooting, disbudding, cutting of scion sticks, defoliation of leaves from the sticks and topping-off small trees. Pruning shears are named according to the type and are single cut, double cut, parrot nose cut, roll cut, etc. A pruning shear has two blades, in which one is sharp, made of high-carbon or alloy steel, and another is blunt, made of copper and is used to support the cutting branch. Both of these are fitted to a handle each. The handles are made of mild steel, which are covered with plastic tubes. The branch to be cut is held in between the blades and the handles are pressed together.

Secateur

Secateur is meant for cutting branches, de-shooting, disbudding, cutting of scion sticks, defoliation of leaves from the sticks, topping-off small trees, etc. It is also useful in pruning pencil-thick branches and making cuttings for propagation (Fig. 4.6).



Fig. 4.6: Secateur

Hedge shear

It is used for performing various garden operations like pruning, cutting and trimming of hedge and shrubs, and making them look attractive. It consists



Fig. 4.7: Hedge shear



Fig. 4.8: Grass shear



Fig. 4.9: Spade



Fig. 4.10: Rake

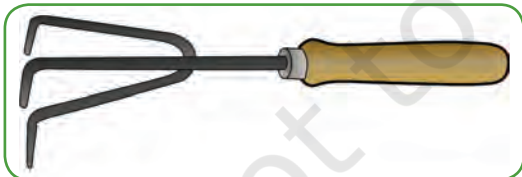


Fig. 4.11: Garden hoe



Fig. 4.12: Khurpi

of two cutting blades with tongs. These are made of high-carbon steel in a single piece. The tongs are inserted for better grip in a wooden handle. The size of the shear is according to the size of the blades, varying from 15 to 30 cm in length and 0.8 cm in thickness (Fig. 4.7).

Grass shear

Grass shear is used to maintain a lawn. It is used for trimming and side-dressing of the lawn. The most important part of a grass shear are the cutting blades, which are made of high-carbon or alloy steel. The blades are sharp at the cutting edges. These are joined to a 'V'-shaped spring steel handle, which always keeps the shearing blades open. Cutting takes place due to the shearing action of the blades. The length of the blade varies and is, usually, 15–20 cm (Fig. 4.8).

Spade

It is made of cast iron and is used for digging or turning over the soil, making bunds in the field and small plots, etc., (Fig. 4.9).

Rake or garden rake

It is used for breaking up the soil surface into a fine tilth, ready for sowing and collecting weeds and stones (Fig. 4.10).

Garden hoe

It is a long handle with a paddle and blade at the end. It is useful for cultivating the garden soil and carrying out weeding operations. There are different types of garden hoe made for specific uses (Fig. 4.11).

Khurpi

It is made of cast iron with a wooden handle attached to one side. It is meant for

weeding, lifting of seedlings and plants in a nursery, transplanting plants in pots and field, and performing various other gardening operations (Fig. 4.12).

Sprayer

It is used for spraying insecticides, fungicides, herbicides, fertilisers and various other chemicals in a field. A variety of sprayers are available in the market to suit the requirements of different plants (Fig. 4.13).

Watering can

It is used for watering seedbeds, nursery beds and potted plants to avoid washing off the soil and causing damage to young seedlings (Fig. 4.14).

Pruning saw

It is used to cut thicker branches of plants (Fig. 4.15).

Wheelbarrow

It can be used to move heavy things from one place to another, and also to collect trash in the garden (Fig. 4.16).

Hand cultivator

It is used for altering and loosening the soil without causing damage to the roots of plants in a garden or nursery (Fig. 4.17).



Fig. 4.17: Hand cultivator

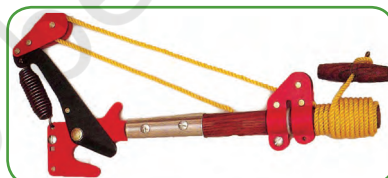


Fig. 4.18: Tree turner

Tree pruner

It is used for pruning the shoots of trees, which are beyond reach from the ground level (Fig. 4.18).

Flower scissors or cutters

These are used for cutting flowers along with the stems. A flower scissor has two short blades with handles (Fig. 4.19).



Fig. 4.13: Sprayer



Fig. 4.14 Watering can



Fig. 4.15: Pruning saw



Fig. 4.16: Wheelbarrow



Fig. 4.19: Flower cutter

Precautions to be taken when using tools and equipment

- Keep all tools and equipment out of children's reach.
- Handle them with care and follow the instructions given in the manual provided with the equipment.
- In case of an accident, immediately contact a doctor.
- Ensure that all equipment are functional.
- To avoid the spread of viral diseases, it is essential to clean the equipment before and after they are used in a field.
- During the spraying of insecticides, pesticides and fungicides, safety measures like putting on the mask, gloves, etc., must be followed.

Care and maintenance

- Clean the all equipment before and after use.
- Store all machinery and equipment in a dry place.
- Drain the tank and flush it with clean water, wash the pump nozzle before and after the use of a sprayer.
- Remove dust from the hopper of the duster and clean it with a cloth.
- Overhaul the machines regularly and replace the worn out parts. Grease and oil all moving parts of the machinery as per the requirement.
- Do not throw the nozzles of sprayers and delivery tubes of dusters on bare ground.
- Always keep all spare parts in the tool kit.
- Sharpen the blades of harrow, cultivators and cutters regularly.



Practical Exercises

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Activity 1

Identify the implements used for land preparation.

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

Procedure

- Identify and enlist the type of implements used for land preparation.
- Explain the use of each implement.
- Draw a diagram and show the different parts of the implements.

Activity 2

Identify various garden tools.

Material required: Garden tools, practical notebook, pencil, pen, etc.

Procedure: Visit a horticultural farm or shop to see the different type of tools and equipment used and note down the following information:

- Identify the different type of tools and equipment.
- Note down the use of each tool and equipment.
- Draw a diagram of each equipment.

Check Your Progress

A. Fill in the Blanks

1. Mouldboard plough can open a furrow of about _____ cm and above.
2. The disc in a disc plough is _____ cm in diameter.
3. Sub-soil single arm plough can be inserted up to _____ cm deep in the soil.
4. Ploughing and harrowing intermediary are performed by _____.
5. The tool used for grafting and budding is known as _____ knife.
6. Secateurs are useful in pruning pencil-thick branches and making _____ for propagation.
7. The implement consisting of two blades with tongs is identified as _____.
8. Grass shear is used for _____ and _____ of the lawn.

B. Multiple Choice Questions

1. An implement used for deep tillage of the soil by breaking up the hard surface is called _____.
(a) harrow (b) plough
(c) level board (d) rotavator

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2. An implement used for levelling fields is _____.
 (a) harrow (b) cultivator
 (c) rotavator (d) plank
3. _____ is used for making bunds and small plots in fields.
 (a) Rake (b) Shovel
 (c) *Khurpi* (d) Spade
4. A tool used for collecting weeds and stones is _____.
 (a) spade (b) rake
 (c) *khurpi* (d) shovel
5. Moving heavy things from one place to another is the function of _____.
 (a) *khurpi* (b) hand hoe
 (c) wheelbarrow (d) shovel
6. Pruning the shoots of trees, which are beyond reach from the ground level, is done by _____.
 (a) pruning saw (b) tree pruner
 (c) secateurs (d) flower scissors

C. Subjective Questions

1. Describe the type of implements used for field preparation.
2. Write in brief on the following:
 - i) Harrow
 - ii) Cultivator
 - iii) Grafting-cum-budding knife
 - iv) Hedge shear
 - v) Secateurs

D. 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. Secateurs	(d) Side-dressing of the lawn
5. Grass shear	(e) Making cuttings of propagation
6. Hand cultivator	(f) Trimming, pruning and cutting
7. Sprayer	(g) Removing unwanted twigs or branches
8. Scissors	(h) Heavy pruning operations

