



Bharathidasan University

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Tamil Nadu, India

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UNIT -II

NURSERY OPERATIONS

DR. A. LAKSHMI PRABHA

Professor

Department of Botany

NURSERY OPERATIONS

NURSERY

- A nursery is an enclosed place where plants such as paddy, cabbage and some flowering plants are grown to a desired age since they require special care. Once they mature to a certain age, they are transplanted in larger fields.
- A nursery is a place where plants are propagated and grown to a desired size. Mostly the plants concerned are for gardening, forestry, or conservation biology, rather than agriculture.

NURSERY EQUIPEMENTS:

- For carrying out day-to-day routine cultural operations in the nursery, various tools, implements and accessories are required.
- Some tools are simple and are used for simple operations, whereas for carrying out specific operations, special types of equipments are required. These are listed and briefly described hereunder: **Tools for land preparation and other basic works.**

TYPES OF EQUIPEMENTS

- A nursery can operate with basic equipments
- Spray unit
- Movable sprinklers
- Pairs of secateurs
- Grafting/budding knives
- Spades
- Hand hoes and rakes
- Plant pot trolleys
- A work bench
- Wheel barrow
- Tags
- Labels
- Pruning saw
- Pruning knife.

SECATEURS

- Secateurs are considered as the most important tool for a propagator or nurseryman.
- It is used for removing scions, lopping off the rootstock, preparation of scion sticks, removal of undesirable shoots/sprouts.
- In training and pruning operations.
- Blades of secateurs should be high quality carbon blade for giving smooth cuts to the stock and scions.



PNEUMATIC SECATEURS

- The pneumatic secateurs, also known as pneumatic pruning shears.
- These are used for pruning vines using pneumatic power.
- Gripping blade of the shear is stationary and shearing action is imparted by the other blade through the movement of piston.
- The device offers effortless, accurate and swift cutting, at the same time ensuring the quality of vines.
- The double acting piston facilitates easy pruning of even large branches.



PRUNING KNIFE

- It is useful for thinning delicate branches ,removing suckers , shaping rose bushes.



PRUNING SAW

- These have sharp blades so that we cut large branches easily.



BUDDING KNIFE

- The budding knife is an important hand tool of a gardener.
- One of the edges is sharpened all along its length.
- The blunt or the other edge is sharpened on the tip and is slightly curved.
- This sharpened curved portion is used to create a "T" opening or slot on the bark of the mother branch or twig for the insertion of the bud.
- The budding knife is used for the
 1. budding operation,
 2. cutting of scion stick,
 3. defoliation of leaves and removing or cutting of unwanted twigs.



GRAFTING KNIFE

- which resembles a household knife.
- The cutting edge of the blade is sharpened all along its length and the other edge is blunt.
- The blade of the knife can be folded into the handle when not in use.
- For cutting and defoliation of scion stick.
- Making of chisel point and 'V' grooves for grafting.
- Slashing of thin twigs and for general-purpose cutting.





Grafting/budding knives

Knife having a combined blade for grafting and budding purposes

A grafting knife has a straight 7.5cm long blade and strong long handle

It has a spatula at the end of a handle , which is used for lifting the bark during budding operations

- * In some knives have 2 parallel double blades , used specially for lifting or removing the patch of a bud from the bud wood.
- * The blade of the knife should be made from high carbon steel and it should be sharp.
- * Generally these knives have either a folding or fixed blade.



Spray pumps

- To spray protective material that is insecticide/pesticide/fungicide to eliminate pathogen or insects.
- Commonly used sprays are knapsack sprayer, rocker sprayer, hand sprayer or power sprayers.
- Depending upon the volume of the nursery and specific purposes different types of sprayers are used.



Pruning shear

- It is made up of iron fitted with wooden handle.
- It is used to prune unwanted branches.
- Collection of scion.
- Trimming of the edges and hedges and topiary works.



WHEEL BARROW

- * It is manually operated small trolley, used for carrying nursery plants, compost, fertilizer, leaf litter etc. From one place to another place.
- * It can be designed into different shapes according to requirements.



WEEDING FORK

- It loosens the soil and helps in weeding also
- It consists of a long handle with a blade of handle teeth.
- It drawn manually with the help of the handle to collect the weeds.



Handle hoe and rake



- It is a rectangular shape metal blade with fork like fore edge.
- It is used for digging ,hoeing,earthing ,levelling and collecting weeds.



SPADE

- It is used for lifting and turning the soil.
- It is used for digging the pit , preparing channels for irrigation and drainage lines.



Labels

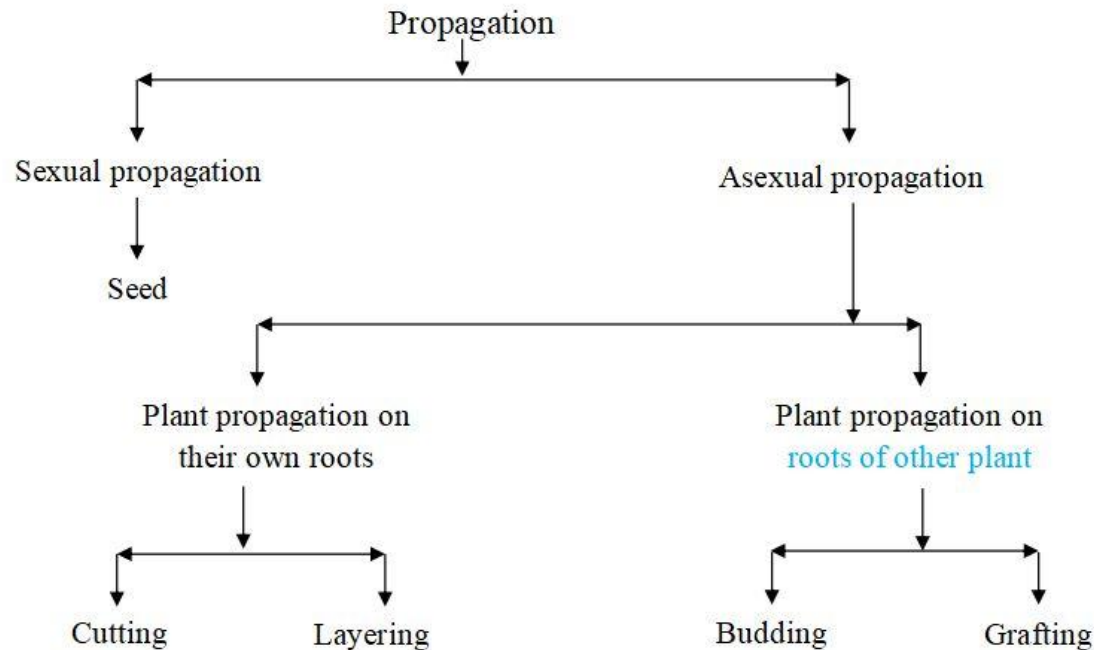
- It is use for labelling of plants before sale.
- Labels may be made of papers ,cardboard , wooden, aluminium and plastic etc.



Propagation

- ▶ Plant propagation is the process of creating new plants. There are two types of propagation: sexual and asexual. Sexual reproduction is the union of the pollen and egg, drawing from the genes of two parents to create a new, third individual. Sexual propagation involves the floral parts of a plant.

Types of Propagation



4. Outlines of vegetative propagation techniques to produce planting material.

Cutting:

Cutting is a detached vegetative part of a plant, which on separation and planting is able to regenerate the missing parts and develop itself into a new plant. It is an inexpensive and quick method of propagation. A large number of uniform plants can be produced using few parent plants. It does not involve specialized skills. The method is named after the part of plant used for cutting, e.g., stem, root and leaf.

Types of cutting:

- (i) Hardwood cutting
- (ii) Semi-hardwood cutting
- (iii) Softwood cutting
- (iv) Herbaceous cutting

Layering:

It is an attached method of propagation. In this method, roots are allowed to develop on the covered portion of the stem while still being attached to the mother plant. After the emergence and development of the roots, this portion is separated from the mother plant and allowed to

grow as a new plant on its own root stem. Such root stem is known as 'layer'.

Types of layering:

- (i) Simple layering
- (ii) Compound or serpentine layering
- (iii) Trench layering
- (iv) Mound layering or stooling
- (v) Air layering

Grafting:

Grafting is the joining of parts of plants together in such a way that they unite and continue to grow as a single plant. The part of the plant that becomes the upper portion or top of the new plant is called the scion and the part which becomes the lower portion that includes the root is called the stock or root stock. All methods of joining plants are called grafting. Several grafting methods viz., cleft, saddle, veneer, approach, root, whip and tongue methods are practiced, while cleft or wedge grafting is the most common field level practice which assures more success.

Budding:

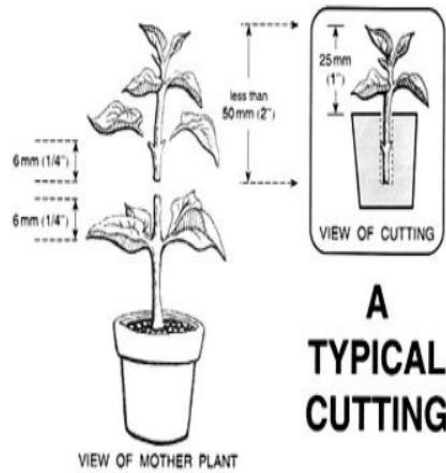
Budding is the process of inserting a single mature scion bud into the stem (rootstock) in a way that results into a union and continues to grow as a new plant. It is also a type of grafting.

Types of budding:

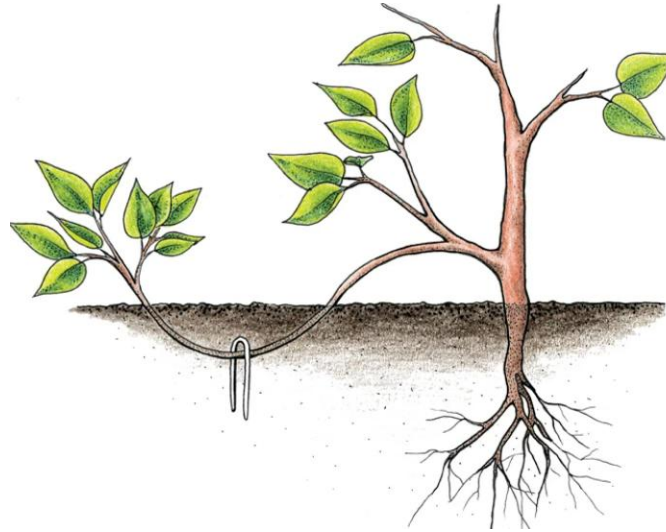
There are many methods or techniques of inserting bud into the rootstock. Some of the common methods are as follows.

- i. T-Budding
 - ii. Patch budding
 - iii. Ring budding
 - iv. Forket budding
 - v. Fluet budding
 - vi. Chip budding
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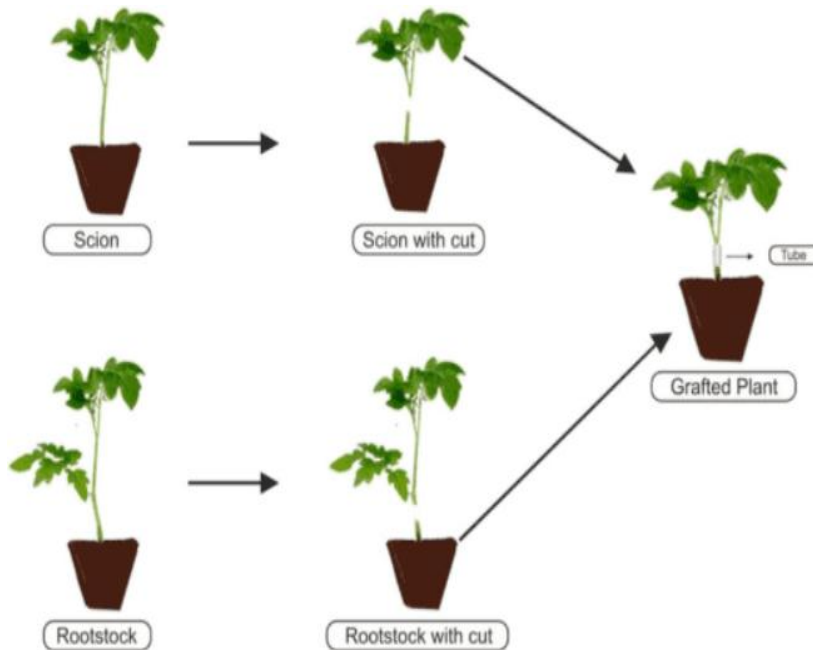
CUTTING



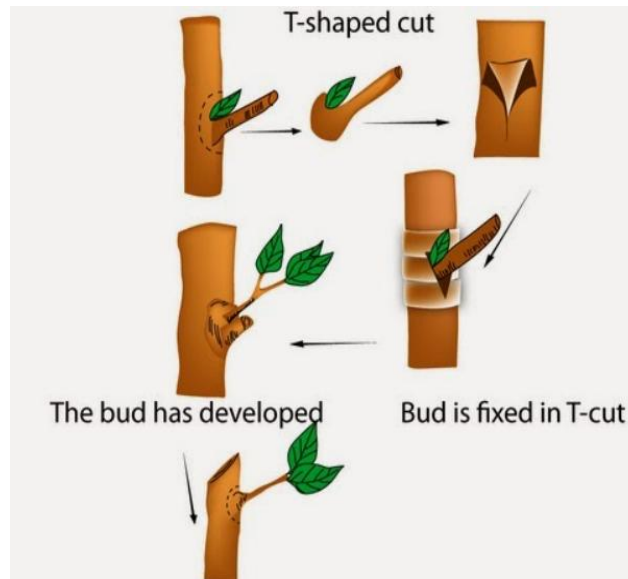
LAYERING



GRAFTING

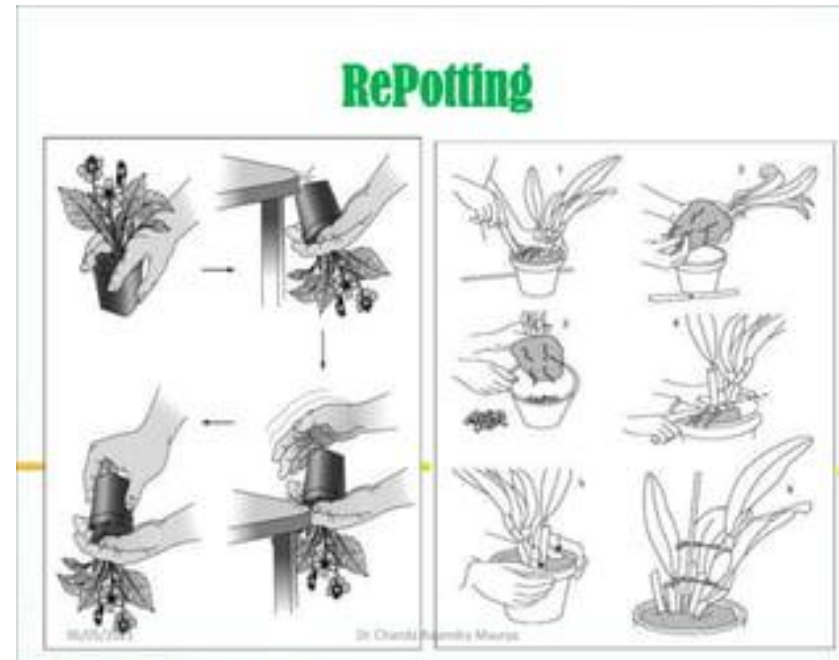
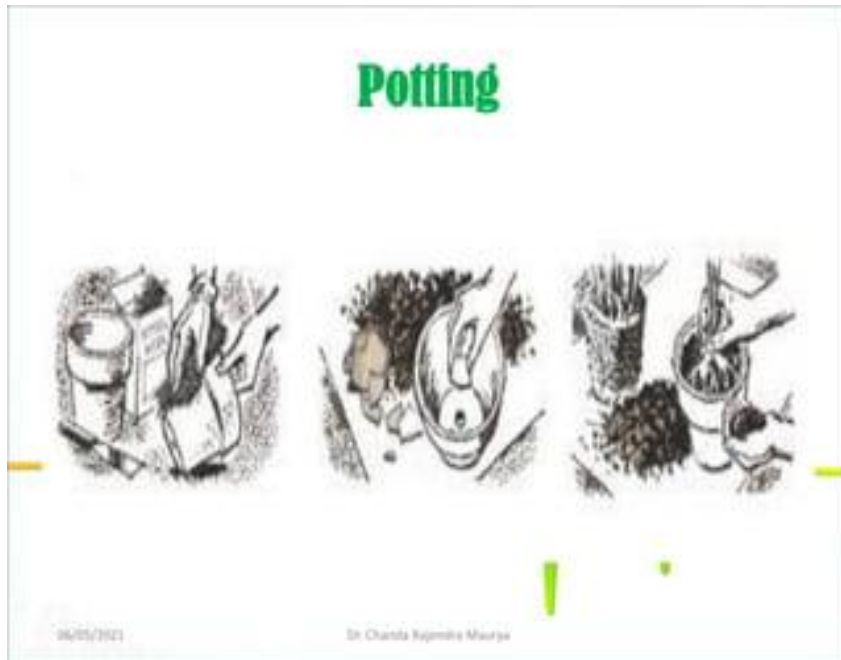


BUTTING



POTTING AND REPOTTING

- ▶ Potting means potting a new plant into a nice pot with drainage holes at the bottom. And Repotting means potting a plant that has out grown its current pot with drainage holes at the bottom onto a bigger pot with drainage holes at the bottom



ROSE CAN

- It is a tubular pipe with rose i.e, fitted into the can through which water is sprinkled over the nursery beds until the germination of seeds.
- It avoids splashing of seeds from the nursery bed due to loose pipe irrigation and flood irrigation.



IRRIGATION METHODS IN NURSERY

Irrigation is the practice of applying controlled amounts of water to land to help grow crops, landscape plants, and lawns.

- ▶ Drip irrigation systems are designed to minimize water consumption by ensuring that water is brought to each individual plant or tree. Pressure compensated dripper nozzles ensure that the output of the nozzles is consistent.
- ▶ As each drip irrigation nozzle has a low output, large areas of drip irrigation can be watered at once. For row crops drip tape can be used to create a low cost watering system, either in tunnels or on outside raised beds.
- ▶ Sprinkler irrigation systems are designed for smaller pots, either under cover or in standing out beds. Modern low output nozzles provide high uniformity of water distribution and can be fitted at lower levels to reduce wind drift.
- ▶ For smaller nurseries, a simple battery valve can ensure the watering is done early in the morning. On larger sites a control panel can operate valve boxes distributed around the nursery.

Fogger



Mister



Maxijet



Sprays



Irrigation Methods

MicroIrrigation

Drip irrigation



Subsurface drip irrigation



Microspray tube



Bubbler irrigation



Sprinkler Irrigation

Solid-set system



Movable sprinkler system



Raingun system



Center pivot

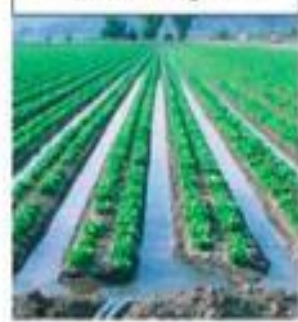


Surface Irrigation

Flood irrigation



Furrow irrigation



Check irrigation



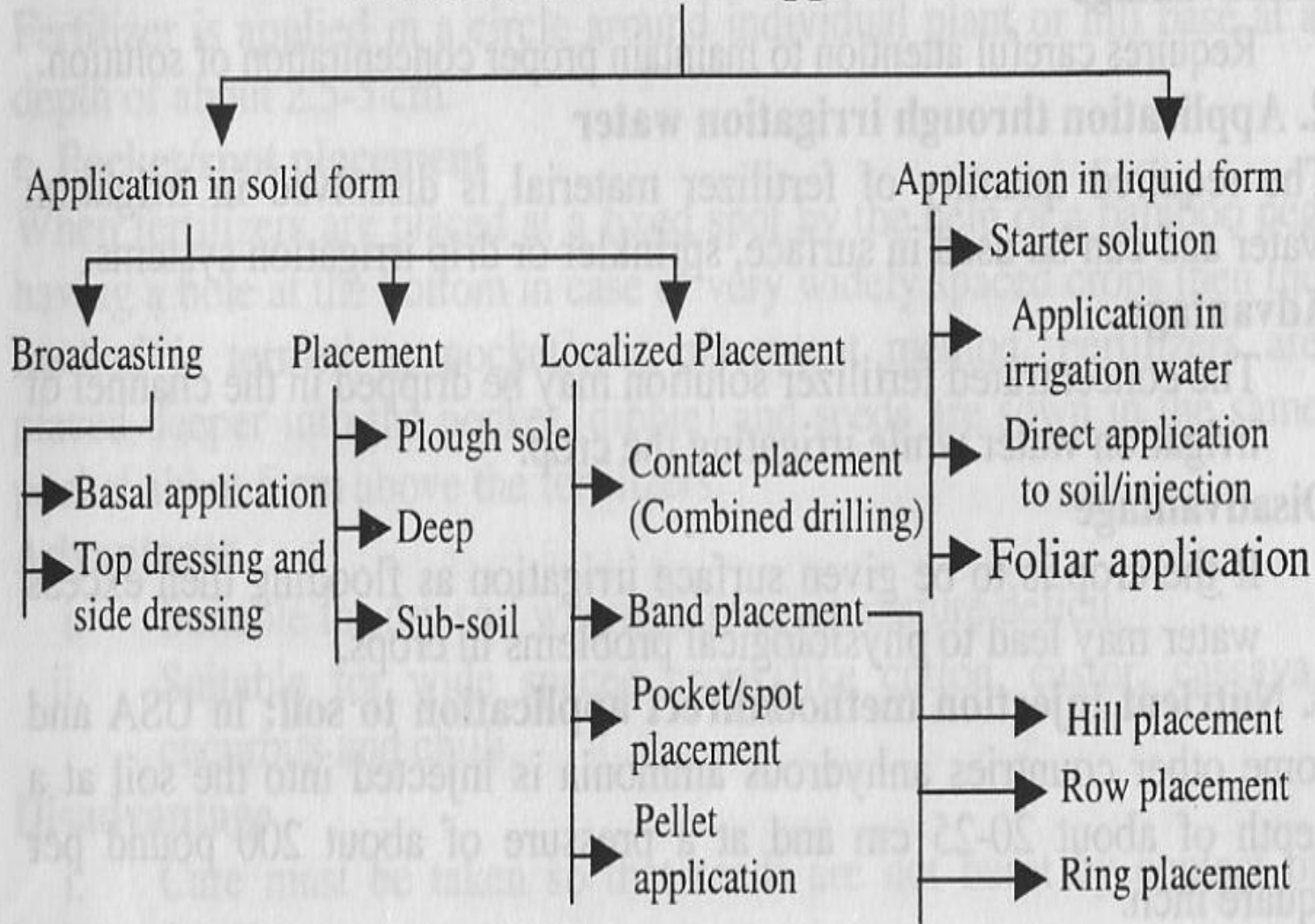
Border irrigation



NURSERY FERTILIZERS

- Nursery fertilizers are specially packaged for nurseries that deal in trees and plants. They provide the nutrients that young plants need to thrive without causing them any damage.
- Nursery fertilizers are available in both organic and synthetic versions. However, it is preferred to use organic fertilizers for nurseries like our Vermicompost, as it is made from organic ingredients and is 100% safe for infant plants.
- There are many different types of organic fertilizers for nurseries in the market, each with its pros and cons. For example, Vermicompost is an excellent source of nutrients for young plants.
- It also helps improve drainage and aeration in the soil, encouraging root growth resulting in safe sprouting of your seedlings and providing uniformity in growth.

Methods of fertilizer application



Usage of vermicompost fertilizer for different nurseries

- Natural or organic fertilizers provide essential nutrients that help plants grow. However, not all fertilizers are created equal, and different fertilizers contain different ratios of nutrients designed for specific plants.
- Why choose Vermicompost? Fertilizers for garden nurseries must contain higher levels of humus and slow-releasing nitrogen, phosphorus, and potassium. This is because young plants need these nutrients slowly to promote healthy growth, and Vermicompost helps the plant to live healthy for longer periods.
- Sikri Farms offers nationally awarded Vermicompost for garden nurseries and larger nurseries that operate as tree and plant suppliers for massive projects. Our product is fungus and pathogen-free, which is vital in improving the germination rate and, in parallel, reducing the death rate of saplings.

HARVESTING

When the crop matures, it is cut for further process. This is known as **harvesting**. It is done by labor and with the sickle, mechanical harvesting is used these days – machines such as combine harvesters are used.

Harvesting depends on many factors like season, crop variety, maturity period, etc. Reaping is the cutting of crops for harvest, by using a scythe, sickle, or reaper.

Methods of harvesting

- **Manual harvesting:** Hand harvesting is a technique for manually or by hand picking grains, fruits, vegetables, leaves, etc.
- **Harvesting with Hand Tools:** Crops are harvested by farmers using a few tools. Harvesting using hand tools includes using a little axe, a big axe, a darat, a gadasa, a small sickle, etc.
- **Machine harvesting:** Machine harvesting is the practice of gathering large quantities of grains with the aid of contemporary harvesters. A contemporary harvester can work in tandem with other massive gear to simultaneously cut and clean the grains.

Harvesting Process Stages

1.Reaping: Reaping is the process of removing mature panicles and straws that have grown above the ground.

2.Threshing: Threshing is the process of separating the food grains—such as paddy, wheat, etc.—from the rest of the cut crop.

3.Cleaning: Cleaning is a crucial step in the harvesting process, and it largely entails figuring out how to get immature and non-grain particles, dust, and other contaminants out of edible food grains.

4.Stacking/Piling: Stacking is a technique for piling or stacking harvested crops for storage.

5.Bagging: The final step in the harvesting process is bagging. For storage and transportation, the threshed grains are kept in gunny bags.

6.Storage: Small-scale farmers use the harvested crop for their own consumption, whereas large-scale production is mostly used for marketing. As a result, the farmers must store the grains. For this, suitable storage space must be set up. A significant loss of grain might result from inadequate storage space and poor storage practices.

PACKING

- Packaging of fresh vegetables and fruits is the scientific method of holding the products so, as to prevent it from physical damage, chemical changes and further microbial contamination in addition to display the product in a more appealing manner to the consumers.

MARKETING OF NURSERY STOCKS

- Owning or managing a nursery may seem like a dream job for those who love the outdoors, growing plants and helping people transform a barren lot into a beautiful landscape.
- However, a nursery is like any other business in that a marketing plan is a critical step to success. Marketing planning is the process of selecting target customer groups and designing a set of strategies and action plans that communicate the benefits your company provides to potential customers.

