Sub-unit 4.3 Plant Nursery Management:

Definition: A **nursery** is a place where plants are propagated and grown to usable size.

Types of Nurseries:

A. On the basis of irrigational facility:

- **Dry Nursery:** It is 'a nursery that is maintained without any irrigation or other artificial watering.'
- **Wet Nursery:** It is 'a nursery that is maintained by irrigation or other artificial watering during the dry periods'.

B. On the basis of size of seedlings:

- **Seedling nursery:** A nursery which has only seedling beds, i.e., in which seedlings only are raised, no transplanting being done is called seedling nursery.
- **Transplant nursery:** A nursery which has only transplant beds, in which seedlings are transplanted for preparation for forest planting is called transplant nursery.

C. On the basis of duration of their use:

- **Temporary Nursery :** It is a nursery that is maintained for supplying stock for a short period after which it is abandoned. Normally, it is constructed in the plantation area & usually small in size. It is suitable for hilly regions.
- **Permanent Nursery:** It is a nursery that is maintained for supplying nursery plants for a long time on a permanent basis. It is intended to meet the requirements of one or more ranges and it is relatively larger in extent.

D. On the basis of type of sell:

a) Wholesale Nursery: grow in bulk and sell their plants and flowers to retail and mail-order nurseries, as well as to other types of businesses like landscapers and commercial gardeners.

b) Retail Nursery: which sell to the retail customers/general public. Or Purchase plants from a wholesaler and then resell them.

c) Mail-order nursery: which sell their products through the mail. ome of them grow their own plants, and still others buy their inventory from wholesalers and then resell. Some retail and wholesale nurseries sell by mail.

(A) MULTIPURPOSE NURSERY

In this type of nursery almost **all kinds of plants are propagated** and **reared** for sale, which may include fruit plants, timber tree, shrubs, creepers, bulbous plants, succulents, ferns, palms, seeds and seedlings of vegetables and annuals etc. This type of nursery needs a quite large area. These nurseries are known as commercial nurseries.

(B) SINGLE PURPOSE NURSERY

In this type of nursery, only **one group of plants are raised** like fruit plants nursery, ornamental plant nursery, vegetable nursery and nurseries raising seedlings, of vegetable & Flowers, raising seeds of annuals & vegetables, bulbs, corms etc.

(C) SPECIALISESD NURSERY

This nursery is one where **a particular kind of plant is raised** for instance **roses**, bougainvillea, mango, guava, **gladiolus**, **poinsettia** etc.

(D) SUPPLEMENTARY NURSERY

This type of nursery is mainly **attached** to an **institution**, **school**, **organization**, with in a big garden in order to supplement the day to day demand of plants for better maintenance of the garden attached to such an institution.

In fact, first three types of nurseries are more or less **commercial nurseries** while fourth one is primarily meant to **meet** our **own requirement** of the managers of the nursery.

It includes propagation, harvesting, packing, storage, marketing, nursery structures, potting, re-potting, sheds, mist chamber, cold frames, Hot beds, greenhouse etc.

(A) SELECTION OF SITE:

1. **Topography of the land -** The topography of land should be plain as far as possible, if undulated, may be levelled if in terrains, may be divided into terraces as large as possible.
2. **Soil -** Loam and sandy loam soil with humus are best suited soil, so that ball of earth should not break while transplanting and plant may not die. pH of soil should range between 6.5 to 7.5.
3. **Water -** It is difficult to improve the quality of water, i.e. Tube well or well water and therefore, source of water and its suitability for plants is paramount.
4. **Drainage -** Proper drainage is very essential. Water should not stagnate overnight in any case. Ensure that extra water of nursery area is flushed out immediately and water from surrounding areas should not enter the nursery area.
5. **Surroundings -** Nursery should be away from brick kilns, smoke emitting industries and other environmental hazards but easily approachable by road or rail.
6. **Market –** It includes buying & selling both. One must ensure an outlet before starting a nursery and the produce in the nearby areas.
7. **Labour -** Infect nursery profession is highly scientific, require green finger craft man ship skill, therefore it is necessary to apply judicious mind while selecting the labour for nursery operations, wages & perks should not only be the criteria.

(B) LAYOUT OF NURSERY

1. **Road and paths -** Each and every corner of the nursery should be well connected with a road or path. Roads should be wide enough, minimum 10 ft. wide to play trucks, tractors, bullock driven bogies, etc.
2. **Sections/Sectors -** The area of the nursery should be divided into different sections/ sectors/ portions like rose section, annual flower section, indoor plant section, vegetable and fruit plant section , ornamental and flowering tree's section, creeper section, shrub's section, succulents and cactus section and so on. This type of division will facilitate better supervision.
3. **Irrigation -** Besides sweet water, the irrigation system in nursery count much, irrigation channels should be proper to minimize wastage of water.
4. **Office cum sale counter, stores and parking -** Proper office of the manager and staff with proper seating arrangement, sale counter attached with modern seed store, chemical room, fertilizer room etc. should be located at the main entrance of the nursery with a spacious, well protected, shady parking lot.
5. **Mother plant block -** It is the real asset of a nursery, which forms a permanent block of different kinds of plants material for further multiplication and perpetuation by different methods of sexual and vegetative propagation.
6. **Boundary wall/fence -** About 2 m high brick wall or angle iron with barbed wire or ornamental railing should be provided all round the nursery area, to check trespassing and pilferage besides protecting a garden.
7. **Propagation beds/seed beds -** Some area is marked for seed beds where seed of different kind may be sown throughout the year to raise the seedlings. Beds should be in semi shade area to protect the tender seedlings from scorching heat.
8. **Transplanting beds -** The plant raised by seed or by the other vegetative methods like cuttage, graftage should not be allowed to remain at one place in ground for long time, therefore, go on shifting, transplanting time to time to avoid penetration of root deep in the soil or root bound situation.
9. **Potting and re-potting areas -** Sheds in form of sunshade should be covered from top and

open from sides to harden the tender pot plants and protection in rainy season.

10. **Packing area -** This area should be near to office to enable better supervision while packing the plants for dispatch. An open area and an underground water tank is a must, besides the adequate space for storing empty cartons, baskets and other packing materials.
12. **Chick House/Shade House -** This is the place where shade/partial shade loving plants are kept under the artificial cover whether square rectangular. A frame of G.I. pipe poles, angle iron poles, wooden poles is erected and sarkanda chicks are spread over this frame to provide the shade, hence it is known as the chick house. Now a days synthetic shade nets in black &green colour of different shade & percentage (40-70%) are available in the market which can be used in place of sarkanda or reed chicks. Coconut ropes may also be used in place of sarakanda chicks.
13. **Natural conservatory -** This is again an area for keeping shade/partial shade created by planting permanent tree in rows, like Jamun/mulberry, mango, sesbania, etc.
14. **Tissue culture lab and hardening area -** This is a latest technique in propagation of plants, to multiply plants in large numbers with in a short period with a minimum stock of mother plant material. It is advisable to have tissue Culture lab in a commercial nursery with a hardening area adjacent to lab duly shaded by green shade nets etc.
15. **Propagation structures -** These are structures with temperature control, ample light and humidity, where seeds can be germinated or cuttings rooted. These structures are known as greenhouse or hotbed.
16. **Greenhouses -** There are several types of greenhouses which can be fabricated. Frame work of a greenhouses can be fabricated with wooden poles and flats, tubular steel or aluminum frames. Green house can be cooled mechanically in the summer by use of exhaust fans at one end and cooling pads on the other end. Inside the greenhouse benches may be erected, beds may be laid as such in greenhouse, and mist irrigation system/ drip irrigation system as desirable.
17. **Propagation frames -** Small light weight frames of reed, metal even bamboos etc. are fabricated and covered with polythene sheets. In these frames generally propagation is done in containers/ propagation pans. Humidity is created by manual spraying of water. These are best suited for the small nurseries.
18. **Media for propagation -** Various material and mixture of material are used for germinating seeds and rooting cuttings. Besides soil, leaf mould, compost, sand, peat, moss, coco peat, wormicompost, sphagnum moss, vermiculite, perlite, synthetic plastic aggregates may be used.
19. **Containers for propagating and growing young plants**

    The following containers are used for propagation and growing plants.

    (i) Flats

    (ii) Clay pots

    (iii) Plastic pots

    (iv) Polythene bags
20. **Accommodation for staff -** There should be some area for accommodation of essential staff, which can be deployed in emergencies and exigencies in the nursery and it will certainly facilitate the supervision and efficiency of works. Accommodation should be outside the boundary of nursery but adjacent to it.
21. **Water pool/lily pool -** There should be one or more water pools for propagation water plants like water lily, lotus etc.
22. **Compost pit/ manure pit -** There should be compost/manure pits in each section, where all the leaves fall and other weed free vegetation can be dumped and allowed to rot into good compost and leaf mould.

Fertilizers:

A **fertilizer** is any material of natural or synthetic origin is applied to soils or to plant tissues (usually leaves) to supply one or more plant nutrients essential to the growth of plants. Fertilisers enhance the growth of plants. This is mainly by two ways as 1) It provides nutrients and 2) Some fertilisers enhance the effectiveness of the soil by modifying its water retention and aeration.

Fertilizers are classified in many ways.

A) They are classified according to its constituents i.e. whether they provide

1) **"a single nutrient fertilizer"** (say, N, P, or K), in which case they contains only one element hence also known as "straight fertilizers" and
2) **"Multinutrient fertilizers"** (or "complex fertilizers"). These fertilizers are the most common. They consist of two or more nutrient component for example N and P.

B) Fertilizers are also sometimes classified as

1) **Inorganic fertilizers**: Inorganic fertilizers exclude carbon-containing materials except ureas. Inorganic are sometimes called synthetic fertilizers since various chemical treatments are required for their manufacture and
2) **Organic fertilizers:** Organic fertilizers are usually (recycled) plant- or animal-derived matter.

Application: Fertilizers are commonly used for growing all crops, with application rates depending on the soil fertility, usually as measured by a soil test and according to the particular crop.

Fertilizers are applied to crops as solids and as liquid. About 90% of fertilizers are applied as solids. Solid fertilizer is typically granulated or powdered.

Liquid fertilizers comprise anhydrous ammonia, aqueous solutions of ammonia, aqueous solutions of ammonium nitrate or urea. These concentrated products may be diluted with water to form a concentrated liquid fertilizer. Advantages of liquid fertilizer are its more rapid effect and easier coverage.

Foliar application: Foliar fertilizers are applied directly to leaves. The method is almost invariably used to apply water-soluble straight nitrogen fertilizers and used especially for high value crops such as fruits

Now a day the addition of fertilizer to irrigation water is most common practice. It is called "**fertigation**". The fertigation shows more advantages as it irrigate or supply the water to the plants as well as addition or supply of fertilizers.

Methods of irrigation:

An adequate water supply is important for plant growth. When rainfall is not sufficient, the plants must receive additional water from irrigation. Various methods can be used to supply irrigation water to the plants. Each method has its advantages and disadvantages.

1.1 Surface Irrigation:

Surface irrigation is the application of water by gravity flow to the surface of the field.

A) BASIN IRRIGATION: Basins are flat areas of land, surrounded by low bunds. The bunds prevent the water from flowing to the adjacent fields.

B) FURROW IRRIGATION: Furrows are small channels, which carry water down the land slope between the crop rows.

C) **BORDER IRRIGATION**: Borders are long, sloping strips of land separated by bunds. They are sometimes called border strips.

1.2 Sprinkler Irrigation: Sprinkler irrigation is similar to natural rainfall. Water is pumped through a pipe system and then sprayed onto the crops through rotating sprinkler heads.

1.3 Drip Irrigation: With drip irrigation, water is conveyed under pressure through a pipe system to the fields, where it drips slowly onto the soil through emitters or drippers which are located close to the plants. Only the immediate root zone of each plant is wetted. Therefore this can be a very efficient method of irrigation. Drip irrigation is sometimes called trickle irrigation.