Module 6.8

“Nursery Raising”

Session-III

Time: 10:00 am to 12:00 pm

By: SI Partners

Objectives of the session

- What is a 'Nursery' and key elements of 'Nursery Management'?
- Transplantation and its advantages
- Advantages of Nursery
- Different Types of Nursery
- Factors to be considered for raising a nursery
- What are the components of nursery?
- Types of Nursery beds & Factors to consider in making a nursery bed?
- Seed Treatment, Site Selection and Soil Preparation, Seeding, Care & Maintenance

What is Nursery & Transplanting?

Nursery: A place where planting materials are propagated, nurtured, grown and sold out to home garden or commercial purpose 'either by seeds' or by 'Vegetative Measures' with care before transplanting at desired sites.

* Seedlings are basic pre-requisite of an 'Agroforestry'; the success of plantations therefore depends on quality of seedlings.

Key Elements of Nursery: The place → The Plant → The Person behind it

Temporary Set up:- Set up in or close to the planting sites. Once the seedlings are raised, it becomes a part of the planting site.

Also called as Site Nursery, Field Nursery /Flying Nursery

Permanent Set up:- This is placed permanently so as to produce plants continuously.

Also called as Central or Main Nursery.

Transplanting & Advantages?

Transplanting: The transfer of ready seedlings from the **nursery** bed, seedling trays or pots to the main field which is already prepared.

The Advantages of Transplantation:

(1) This method ensures maximum utilization of land

(2) Helpful in achieving an economical use of water

(3) Crops can be planted in the fields at the right time

(4) The drainage of water from field before the harvest becomes easier

(5) The productivity increases and we can predict the exact harvest time

(6) Controlling the pests, weeds and diseases becomes relatively easier

Advantages of Nursery

1) It is convenient to look after the 'Baby' seedlings
2) Provides favorable growth conditions i.e. germination as well as growth
3) Eliminates the problem of difficult soils
4) Easier to control weed
5) Reduced field management costs
6) Improved crop uniformity
7) Higher yields
8) More optimal use of hybrid seeds
9) Shorter growing season and efficient use of land
10) Accurate prediction of Harvest Date

Types of Nurseries

Retail

- Smaller in size (50 acres or less)
- Sell to Ultimate Users- mostly home owners
- Often offer other related products
- Ex-Fertilizers, media and other supplies

Wholesale

- Usually larger operations
- Sell in volumes to industry related customers
- Ex-"Big Box "garden centers
- Ex-Municipalities
- Ex-Landscape contractors & others

Wholesale Speciality

- Typically produce products to sell to other wholesale nurseries to grow on
- Ex-Rooted Cuttings, Seedings, Liners & Tissue culture

Greenhouse Crops

- Flora culture crops- selling mainly to retail stores
- Vegetable starts
- Cut flowers to wholesale distributors

Factors to be considered for raising a Nursery

(1) Location of Nursery, market demand

(2) Near to the house

(3) Well exposed to sun, but protected against severe heat, Agro Climatic conditions

(4) Well protected against animal damage, strong winds

(5) Water Availability: a) Choose a place near to the source of water
b) Ensure continuous supply of water
c) Seed bed needs to be kept moist not continually wet

(6) Soil Parameters: a) Soil should have a large quantity of organic matter
b) Neither too coarse nor too fine soil
c) Fair degree of water holding capacity
d) Rich in all the elements

Components of Nursery

In nursery, the land may be divided into minimum four parts:

- area for mother plant,
- area for seed production,
- area for raising flower seedlings and.
- area for storing of seedlings or vegetative propagated perennial plants.

Components of forest Nursery

Poly house

Seedlings from cuttings

Poplar seedlings from cuttings

Components of Nursery

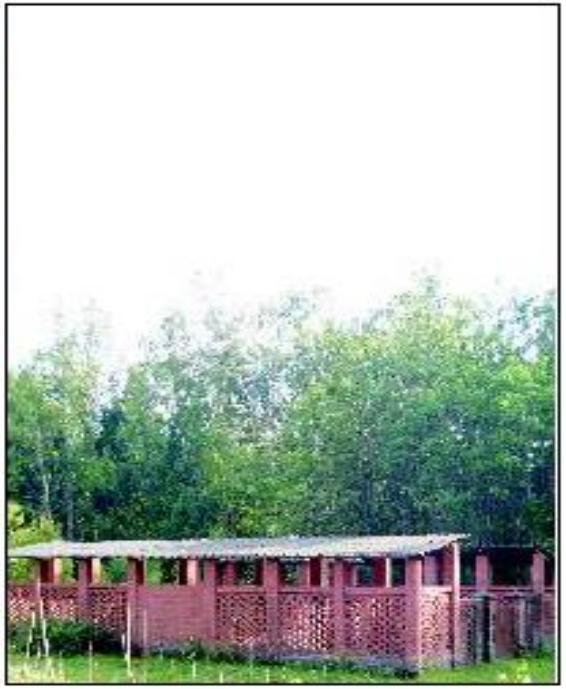
Seedlings grown in polybags

Temporary green house

Trolley for transportation

Barbed wire fencing

Stand for seedlings transportation



Composting unit

Nursery beds, Important factors to consider

Nursery Bed is a prepared plot of land for raising seedlings. These are prepared to germinate the seeds, keep polypots and transplant pricked out seedlings

* It acts as a temporary home for young plants until they are eventually planted in the main garden.

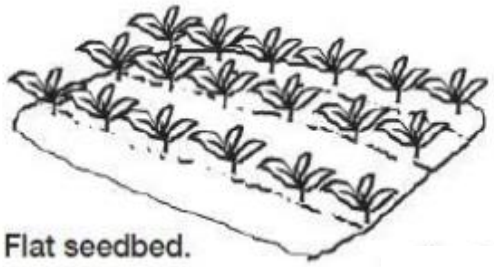
Factors to prepare the Nursery beds:

- Preferred Bed Size: In plains is 10 X 1 m and in Hills is 2 X 1 m
- Width of the beds should not exceed 1.2m; to avoid problems in watering of seedlings
- The orientation of these beds should “East-West in Plains” and “Along contour in hills”.
- In areas where lifting is restricted due to frozen lands, “North-South” orientation is recommended so that the seedlings are thawed well and easy lifting.

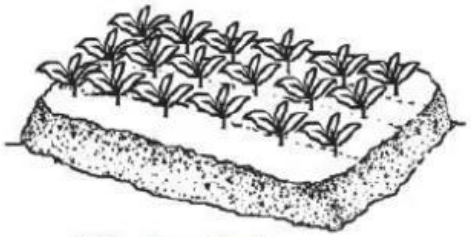
Types of Nursery beds, Types

Types of Nursery beds:

- **Flat Beds:** These types of beds are mostly prepared during the Spring-Summer season when there is no risk of rain and the areas where soil is light sandy to sandy loam and no problem of water stagnation. The beds are flat to the level of ground.


Flat seedbed.

- **Raised Beds:** These types of beds are mostly used in moist areas. The beds are raised 15 cm above ground to increase drainage and promote warming of the seedbed. Seedbeds are given side supports of bamboos, twigs, bricks or other locally available materials.


Raised seedbed.

- **Sunken Beds:** These are 15cm deep and used in arid areas and hot places to protect seedlings from hot winds, and also to protect from evaporation, thus reducing consumption of water.


Sunken seedbed.

Seed Treatment

Pre Sowing Treatment of Seeds:

Seeds contain tiny, fragile plants that live under the hard seed shell. They need water to germinate. Some seeds have such a hard shell that water cannot easily enter the seed to help it sprout.

Pre-sowing treatment of seeds facilitate germination, therefore, all plants will be of the same size and ready for out planting at the same time.

Seed Treatment Methods:

-Boiling Water Treatment: + Generally used for species having hard coating.

+ Seeds are boiled for 1-2 mins

+ After 2 mins, seeds are poured into cold water for 3 days, left to swell. The water can be changed each day

+ Seeds are sown immediately after treatment

Seed Treatment

-Hot Water Treatment: + Species with hard shell viz. Albizia, Cassia, Callindra, Leucaena etc.

+ Sufficient quantity of Water is boiled in a container

+ Boiled water is taken off the fire and allowed to cool for 10 min

+ Seeds poured into container and kept as such for 2 days until most of the seeds swell. Water can be changed daily

+ Seeds are sown immediately after treatment

- Cold Water Treatment: + Some seeds need a lot of water for germination

+ Others may have chemicals inside the seeds which must be removed before the seeds can germinate. Ex- Citrus, Pinus, Neem

+ Seeds are kept in sufficient water for 1-2 days, water can be changed every 12 hrs and seeds floating on top must be discarded

+ Plant all swollen seeds immediately.

Seed Treatment

-**Wet & Dry Method:** + Generally used for Teak seeds.

+ Seeds are sowed in cold water one day. Next day dried in sun.

+ When dry, they are again soaked for overnight.

+ The process is repeated for about 20 to 30 days after that seeds are sown in a germination bed.

- **Cracked Shell treatment:** + The method of seed treatment is generally used for the seeds which are contained within a nut.

+ When the shell is cracked, water enters the seed and they germinate immediately.

+ The nuts are kept on a solid surface and hit with a piece of wood or a small hammer.

+ One has to be careful not to hit too hard to crush the seed inside.

+ Once the seed is cracked, sow it immediately.

Seed Treatment

- **Pre Sprouting Treatment:** + This method is used for the seeds which have a very short viability e.g. neem.
  + Seeds are spread between the pages of newspaper.
  + Wet the paper and put them in the shade.
  + Seeds start germinating and must be transplanted immediately when the roots emerge.

Site Selection and Soil Preparation

* **Site Selection** is an important aspect for establishment of good quality nursery. Not just the physical aspects but also the end use of the seedlings also needs to be ept in mind while selecting the site.

Following Points need to be kept in mind:

a) **Location:** + The site should be centrally located with easy access for transportation of seedlings.

+ It should be close to the area where seedlings are to be utilized.
+ The site should be as square as possible.
+ Sites used earlier for agriculture may be avoided and preference be given to former forest sites where weed problems will be less and beneficial mycorrhizae forming fungi are often endemic

Site Selection and Soil Preparation

b) **Water:** + Enough water should be available especially during the dry season.

+ A natural source of water, at a higher level, will be cheaper, as it can be tapped by gravity.

+ If no natural source of water is available, ground water may be used.

+ It is estimated that the water requirement for a semi-arid area is minimum of 2,000 lit per day during summer, for every 1,00,000 seedlings.

+ Requirement of water will be somewhat less for moist or cold areas.

c) **Topography & Drainage:** +The area should be almost flat with good drainage.

+ This can be managed by providing gentle slope (5 degrees) and channels should be dug to drain out excess water from the nursery.

+ In the hills, NURSERY TECHNOLOGY, Northern aspect is desirable up to 1,200 m elevation and beyond it.

+ Western or South Western aspect is best for moist areas and Northern for dry areas.

+ Nursery site should not be selected close to the edge of a high forest or in the middle of the grassland.

Site Selection and Soil Preparation

d) **Soil Preparation :** + The ideal forest nursery should have sandy loam to loamy texture.

+ Sandy soils may be given preference over heavy soils.

+ Soil should have pH 5.5 to 7.5, moderate fertility, with a min 2.5% of organic matter.

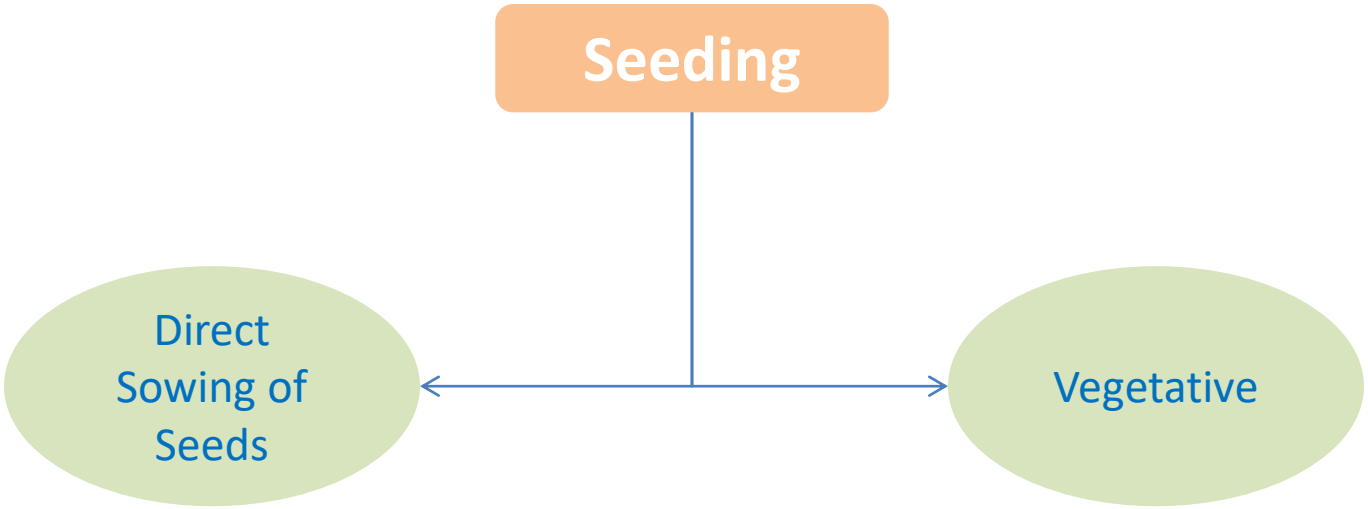
+ The higher the organic matter content of the nursery soil, the better it is.

+ A high organic matter content ensures good retention of nutrients and water and may improve the working properties of the soil.

+ The depth of soil should not be less than 25 cm. It is not always possible to get good soil everywhere.

+ Under such circumstances, one has to get extra soil, sand as well as farm yard manure from outside; therefore, location of nursery should be close to such areas.

Seeding



* Seeds are directly sown in polythene bags.
*Fill polythene bag with dry soil and leave idle for few days
*Pour water a day before sowing of seeds
*Two seeds/bag to be sown and covered by sand
*Heavy soil will hamper germination
*Seeds sown into bags grow normally compared to pricked out seeding.
*Only healthy seedlings should be retained, others should be pricked out

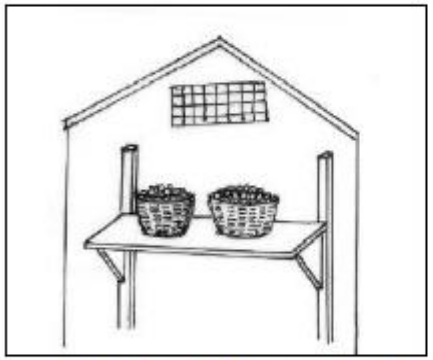
* In case of small size of seed or infertility, plantations are done based on vegetative methods.
*Cutting of sections of roots, stems, branches undertaken suitably from mother tree.
*Light loose rooting medium needs to be used
*Soil to be dug up 30 cm, cutting from 5-10 mm dia & 15-20 cm of length to be obtained from vigorous tree.
*Leaves should be trimmed to avoid transpiration
*cuttings for rooting into small poly houses to maintain humidity
and temperature

Seeding

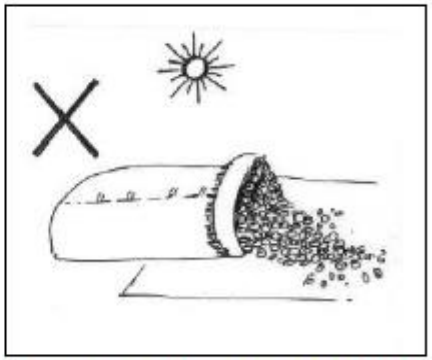
Box-1 Germination Percentage of Some Tree Species	
Species	**Germination percentage**
Amla, Chullu, Jackfruit, Kachnar, Khair, Malu, Mango, Sal, Siris, Tungla	90-100
Bakain, Bhimal, Cheura, Dhak, Kharik, Maple, Mehal, Pine, Ritha, Robinia, Wild cherry, Walnut	70-90
Bamboo, Birch, Kafal, Ringal, Rohani, Shisham, Imli	50-70
Cedar, Chamkharik, Hisaru, Ruins, Semal, Teak	50-70
Kakra, Fir, Thuza, Tun	20-30
Amaltas, Jecaranda, Sadabahar	10-20
Kumkum Papri, Surai, Spruce	5-10
Alder, Bakli, Banyan, Bedu, Khaina, Pipal, Timla	1-5

Box – 2 Species Raised Through Cuttings	
Species raised through cuttings	**Period of planting**
Chullu , Mehal , Mulberry , Poplar, Siris, Subabul	February to March
Cheura, Timla	July to August

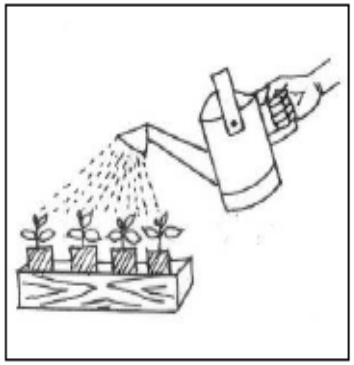
Seed Care & Maintenance



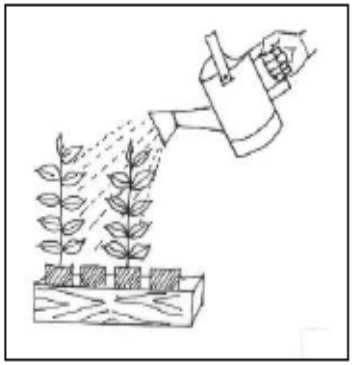
Seeds must be stored in a dry cool place. Store large and soft seeds in open baskets



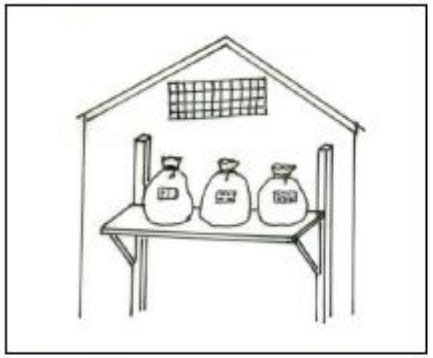
Do not place the freshly collected seeds in the sun. They may get killed due to excessive heat



Pour small quantity of water on small seedlings whenever they need it

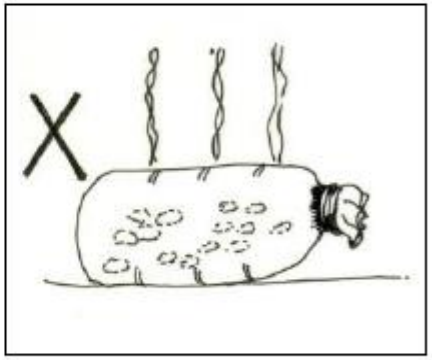


Big plants should be regularly watered with larger quantity



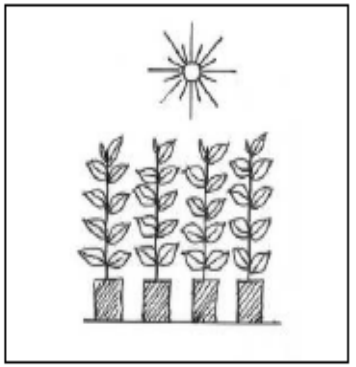
Hard shelled seeds e.g. subabul, teak, pine, *eucalyptus, acacia,* etc. can live for a long time in storage. Dry them properly before putting them in plastic bags. Be sure that all the air is forced out of the bag before you close and seal it. Never store seeds on the ground. Store seed bags on shelves in a rat proof shed.

Do not leave seeds in the rain, or in wet areas. Seed will root and die.



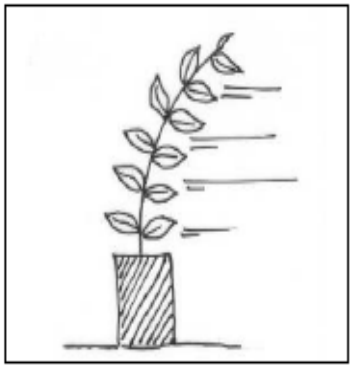
Do not put soft seeds like neem in a large gunny bag. It may generate much heat to kill the seeds.

Watering to seedlings, when kept under shade, should be less and not very often



Watering to the seedlings/plant, kept in open or under sun, should be more often

During dry and windy days watering to seedlings/ plants should be more and often



Seed Care & Maintenance

Seed Care Practices

Thank You!!