Session Three

PLANTING

Objectives

1. To know how to establish and manage a tree nursery successfully.
2. To know the best procedures for transplanting seedlings from the nursery into the field.
3. To know how to care for the seedlings in the field.

In the previous session you read about several uses of trees. Given the many advantages, you are probably planning to plant some trees on your farm. There are several ways to do this, and this session will go through the most important steps.

We thought it would be wise to bring up this discussion early so that you can start planting trees as you go on learning in your study circle.

3.1 Why is it good to have your own nursery?

For quite a long time many farmers have been supplied with free tree seedlings. Today things have changed and projects can no longer distribute free seedling as they did previously. Many farmers have therefore started to establish their own nurseries.

There are many benefits in establishing your own nursery:

1. You can raise your preferred quantity and type of seedlings.
2. You will no longer be dependent on seedlings from outside.
3. You will be able to sell surplus seedlings and gain income from the sales.

Can you think of other benefits from having your own nurseries? As you go on reading, think about the possibilities of establishing a nursery as a group. What would be the advantages and disadvantages of managing it together?

3.2 Seed collection

The first step in establishing a tree nursery is to collect seeds. Without adequate seeds, you will never be successful in raising tree seedlings. There are two ways of accessing seeds:

1. You can buy seeds from others or from projects that distribute them. When getting seed always ask for the right seed treatment before sowing.

2. Collect seeds yourself by picking them from your own trees or from trees near your farm. The advantages:
   - You are likely to get the quantity of seeds you need.
   - You are sure seeds are fresh and will germinate.

If you have decided to collect your own seeds, then the following steps are advisable.

Steps in seed collection

1. Collect seeds from as many different trees of the same species as possible or exchange seeds harvested with other farmers.
2. Pick matured seeds that are free from pests and diseases only.

3. Dry in the shade and turn seeds several times so they do not begin to rot.

4. Sort seeds by removing bad ones and those damaged by insects.

5. Store your dried seeds in an air tight container.

6. Label your container and keep it away in a dry and dark place.

3.3 Choosing the area for nursery establishment

After collecting seeds the next step is to select the suitable place for your nursery.

The area has to be close to a reliable water source as seedlings need to be watered every day during the dry season. The nursery should therefore also be placed at a convenient site, such as near to your homestead.

Normally, water which is good for human consumption is also good for watering the seedlings. However if you collect water from boreholes or springs, you should make sure that the water is not too saline. Water with a high content of salts can cause death of seedlings due to dehydration in some tree species.

The area should be on a flat land or a gentle sloping land.

It should not be on a steep slope.

It should receive sunlight for the major part of the day.
It should be well-fenced to protect your seedlings from livestock and theft.

It should have good soil:

- A mixture of large and small particles
- Moderate moisture holding capacity
- Drains quite well
- Fairly easy to work with, does not get sticky
- Quite good aeration

Nurseries need a lot of soil so place it near a good source of soil. Good nursery soil can be collected from an old cattle kraal, around base of mountains, under big ficus trees far from ant hills, or from a mixture of river sand and kraal manure.

3.4 Preparing nurseries and sowing

Before raising your seedlings think of the method you are going to use. There are three major methods of raising seedlings:

1. Direct sowing and planting cuttings in the field
2. Sowing in containers
3. Sowing in raised beds

Method 1: Direct sowing and planting cuttings in the field

The first method is direct sowing of seeds or planting cuttings in the field without raising them in the nursery. Direct sowing or planting can be done for trees like Sesbania, Albizia, Gillicidia and others for live fencing, fodder and improving soil fertility.

Direct sowing

(a) Prepare the field by tilling the land and make lines.
(b) Treat seeds as recommended. Plant the seeds in lines and at recommended spacing.

Planting stem cuttings

(a) Cut a stem from the matured branches of a tree like Gillicidia.
(b) Put a mark to show the upper side.
(c) Tie the cuttings in bundles of ten.
Store the cuttings in the shade and water a little to quicken the sprouting.

Plant the cuttings with the upper mark showing without delay.

Cuttings can also be temporarily planted in polythene tubes for them to sprout before actual planting in the field.

**Method 2: Sowing in containers**

The second method of raising seedlings is using polythene tubes. Since polythene tubes are expensive you can use empty tins or other empty food containers like milk bags. Be sure there are holes at the bottom of the container for water to drain out.

**Preparing the planting container**

Materials that can be used as planting containers:

- Polythene tube
- Used empty tins
- Plastic bags
- Milk bags
- Paper cartons

Mixing soil and filling planting container

1. Clear the area and level it.

2. Take three buckets of soil, one bucket of manure and compost, and one bucket of sand or rice husks and mix them thoroughly.

3. Fill the tube with soil, press the soil slightly, leaving two centimetres along the top of the tube.

4. Water the soil slightly before sowing the seeds.

Remember: If you use tins or plastic bags make holes at the bottom for water drainage.
Sowing seeds in containers

After preparing seeds you need to sow them immediately in polythene tubes or other containers you have filled with soil. Remember that some seeds need treatment before sowing; see seed preparation on page 25 and 26 or in section 3.5 below for more information.

1. Sow the seeds in polythene tubes, tins or bags.

2. Cover the seed with soil equal to the size of the seed itself.

3. Cover the containers using dry grass to limit direct exposure to the sun.

4. Remove grass cover after seeds have germinated.

Method 3: Raised beds

The third method is establishing seedlings in raised beds. This is a good and simple method as you do not need polythene or tins.

Sowing seeds in a bed

Remember that some seeds need treatment before sowing; see seed preparation in the next section.

Preparing the raised bed

1. Use log off-cuts ten to twelve centimetres thick, pegs or bundles of thatching grass, or bricks.

2. Join the four logs and fix pegs on the outer sides to prevent them from moving. You can also use bundles of thatching grass.
3.5 Seed preparation

Do the seeds require any pre-treatment?

Raising trees can be tricky. You might find that especially indigenous species seem as if they do not germinate. On the other hand some germinate easily in our gardens and fields.

You should know that there are ways to improve the germination of a seed. Some seeds, such as Pawpaw, do not need any pre-treatment but the seeds of many trees, for example Sesbania sesban and Leucaena species, will germinate faster if pre-treated.

There are four ways of treating seeds:

(i) Soaking seeds in cold water

This process is recommended for seeds with soft seed coats or shells such as Neem, Moringa, Gliricidia and Acacia augustissima.

1. Soak the seeds in cold water for 12-24 hours.
2. Remove all floating seeds. The ones remaining at the bottom are ready for direct sowing or planting in the nursery.

(ii) Prepare seeds with hot water

Ideal for seeds such as Leucaena, Sesbania, Acacia, Albizia etc.

1. Boil water
2. Take boiled water off of the fire.
3. Wait one minute, then add seeds.
4. Leave seeds in the hot water for one minute then pour off the hot water and add cold water.
5. Soak for one day.
3.6 Managing the nursery

Next to watering in the morning and evening the nursery still needs more care such as weeding and root pruning. Soon after sowing the seeds, do the following:

**Watering**

Water in the morning

Water in the evening

Water the nursery every morning and evening for the first four weeks. Do not water the seedlings during the middle of the day or afternoon.

**Additional care**

The nursery needs fencing to protect the seedlings from wind and animal damage as well as theft.

Remove weeds and apply water slowly to avoid damage to the seedlings.
Prune the roots with a pair of scissors or a knife when seedlings are the height eliminated to the span of your palm and when their roots have started to penetrate into the undersurface.

If it is in a raised bed, prune the roots by using a panga knife or wire underneath the bed, soon after watering.

3.7 Planting and managing trees in the field

Seedlings should be transplanted immediately after being removed from the nursery. You are advised to dig holes before transporting seedlings to the field.

**Digging planting holes**

Dig a hole by separating the top and the sub soil.

The hole should be 30 cm deep and 30 cm wide, the size of the arm to the elbow.

If the soil is too dry, wet the hole slightly before planting.

**Transporting seedlings to the field**

A good time to start transplanting seedlings is when reliable rains have set in.

Transferring seedlings from the nursery to the field needs great care to avoid damaging them.

If your seedlings were raised in polythene tubes or tins:

1. Prepare a box or sack.
2. Choose strong seedlings.
3. Pack the seedlings neatly, ready to transfer them to the field.

For your seedlings from the raised bed remember to do the following:

Water the nursery to wet the soil before uprooting the seedlings.

Pack the seedlings with as much soil as possible in the box, ready for transplanting in the field.
Use a sharp knife to dig between the lines and seedlings on all sides.

You can also uproot seedlings using a knife or a spade.

Use a panga knife to prune the roots.

Tie these bare-rooted seedlings and pack them either in a box or sack ready for transplanting.

How to transplant the seedlings

1. Remove the tube by tearing.

2. If you used a tin, bang it from the top slightly.

3. Remove the seedling from the tube with its soil by holding it at the base of the stem.

4. Put the seedling in the hole and cover it with the top soil and then the sub soil.

5. Press down the soil nicely

6. Make a small basin around the seedling to help maintain rain water. The seedling should be planted on a little mound in the middle of the basin so that if the basin fills with water it will not flood the seedling.

7. If there is not enough rain, water the seedling at least twice a week.

8. Fence the seedling to protect it from animals and children.

3.8 When to plant

A suitable time for preparing the nursery is three months before the rains normally begin. When to plant in the nursery depends on how fast the type of tree grows. Examples of fast-growing trees are Pawpaw (Carica papaya), Sesbania sesban, or Leucaena (leucocaephala, pallida, trichandra and diversifolia). Slower-growing trees are species such as Pine (Pinus), Pterocarpus angolensis and Faidherbia albida.

In Zambia for instance, the time to plant fast-growing tree species is late October or early November. Slower growing trees may be planted as early as July through September.
1. Where can you find seeds or seedlings for your planting?

2. Your success in raising trees also depends on the quality of the seed you use. Plant healthy seeds from healthy trees! How do you know a tree is healthy? How do you know a seed is healthy?

3. How do you know if the seeds need to be pre-treated?

4. What are the advantages and disadvantages of planting in nurseries or directly in the field?

5. How can you find out whether the tree can be planted through cuttings? What would be the advantages and disadvantages of planting from cuttings instead of planting seeds?

6. What problems would come from letting weeds grow too large in the seedling containers?

7. Where can you find some good black soil for planting?

8. How do you know when to plant a certain tree?

9. Some people do not remove the nursery container when transplanting the seedling into the field but leave it around the seedling. What are some advantages and disadvantages?

10. What will you tell your children to help them appreciate the trees and care for them? Can you think of any other threat to your young trees?