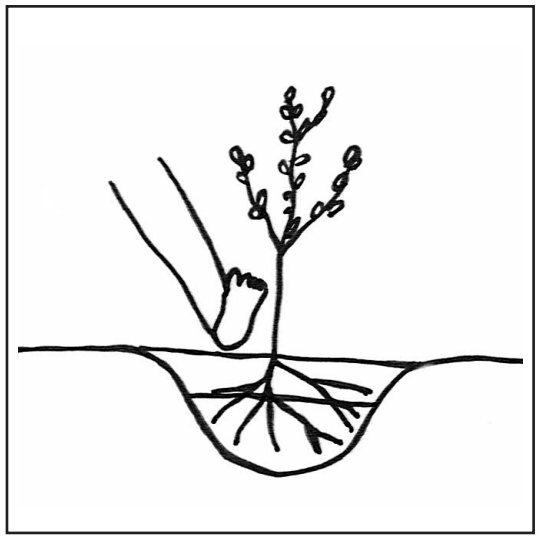
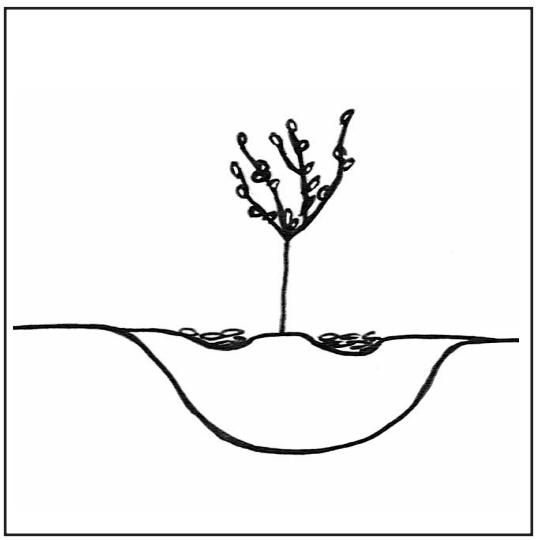
Planting out Firewood and Fodder Trees





HDRA
the organic organisation

produced by

HDRA - the organic organisation

This booklet follows on from an HDRA booklet on raising seedlings in a nursery.

Take care when planting out

Many seedlings die when planted out in the field. This is sometimes because the species chosen is not suitable for the environment. More commonly it is because of the bad handling and planting techniques used.

This booklet aims to provide guidelines for planting and caring for firewood and fodder tree seedlings. It describes how to plant out potted plants and bare-rooted seedlings. It is important to note that whilst using pots or polybags may be expensive, the rate of survival of potted plants is much higher than bare-rooted seedlings, especially in dry areas.

Preparing for transplanting to the planting site

Size

A general rule, to determine whether a seedling is the right size for planting out is that it should be more than 15cm high but less than 100cm.

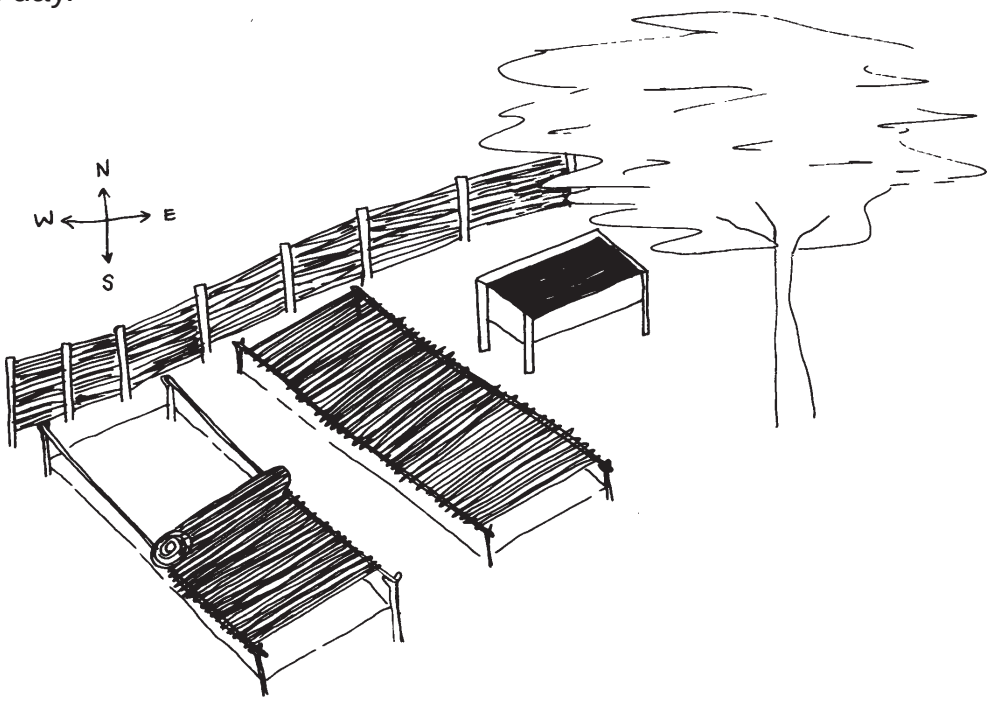
Different trees grow to different sizes so it can be difficult to tell if a plant is ready for planting out. In general the root system should be no longer than 20cm. Any longer and severe root damage can occur and the plant may die. To find out if a tree is ready for transplanting take a seedling out of its container or bed and measure the roots.

Hardening off

Hardening off is the gradual reduction of water and shade during the last few weeks in the nursery. This prepares the seedlings for the conditions they will live in when they are planted out to their permanent site.

4 to 6 weeks before planting out, reduce the watering to once per day. After about a week at that rate, water every other day. If the trees do not begin to wilt the amount of water can be reduced even further. If the trees do wilt, water the plants immediately to stop more damage.

Also, 4 to 6 weeks before planting out, start removing the shade for a few hours every day. Little by little remove the shade so that the plants are in the sun all day.



Reduce shading gradually before planting out

Selection

Two weeks before planting out, move the seedlings around within the nursery. Move the containers to break any roots that have rooted into the ground. Some seedlings suffer due to this move and may die. This kind of selection means that you will not plant a weak seedling which will die soon after planting.

Before planting out, look at the nursery and take out any seedlings that are diseased, very small, very large or discoloured.

Very large trees have outgrown their containers and their root systems are deformed. These trees have a higher chance of dying. It is therefore better to choose average sized plants.

The planting site

Planning ahead

The seedlings and the planting site should be completely ready, especially in dry areas when the planting is done immediately after enough rain has fallen to moisten the top 20cm of soil. Also plan realistically: A small job well done is better than trying to achieve more but only poorly.

Timing

Aim to plant trees during the second week of the rainy season, or when the soil has become totally wet during the rainy season. The best time to plant is in the evening, on a cool day or when it is cloudy. This reduces evaporation from the seedling which will suffer the shock of being planted out.

Site preparation

- Make sure that access to the site is managable with whatever vehicle or means you will use to transport the seedlings.
- Mark out the site where each seedling will be planted.
- Clear the site for ease of work and weed the area around the planting site for each seedling, including roots to reduce competition for water and light.
- Make sure that you have water on site to be able to water seedlings immediately after planting out.
- **In dry areas it is best not to dig the holes a long time before they are to be used as they may dry out even more.**
- Water conservation measures can be put in place, such as micro-catchment systems, before planting out (see last section in this booklet).

Transporting the seedling to the site

Potted seedlings

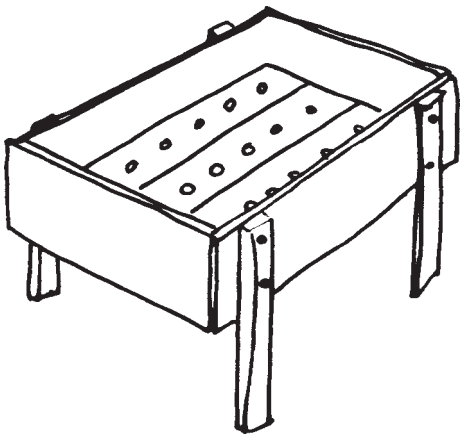
Potted seedlings will survive better than bare-root seedlings when planted out in the field. This is because they have a more complete root-system that will not be disturbed.

Potted seedlings are heavier to transport, however the advantage is that they can be moved in small batches before the planting operation begins. **If you do this ensure that the seedlings have undergone the hardening off step described above. Alternatively this can coincide with the period of hardening off described above.**

Bare-root seedlings

Seedboxes

Seedboxes can be moved to the planting site as with potted plants described above. This job can be staggered by transporting the seedlings to the site over a period of 2 weeks. **If you do this ensure that the seedlings have undergone the hardening off step described above. Alternatively this can coincide with the period of hardening off described above.**



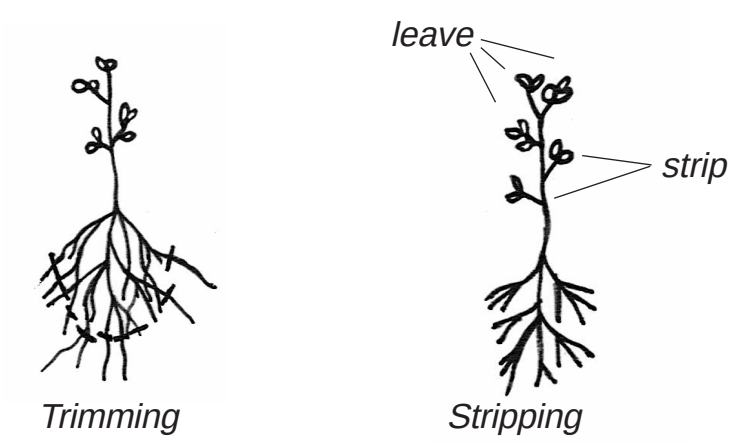
A seedbox

Bare-rooted seedlings

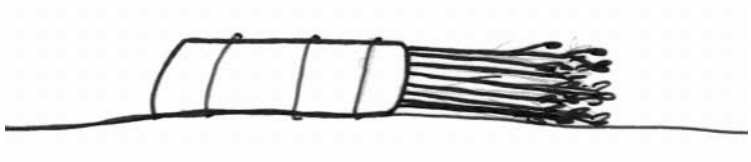
Bare-rooted seedlings should not be moved until the last possible moment. **As short a time as possible** should elapse between up-rooting them and planting them out.

- Up-rooting: This operation requires special care and attention. When the seedlings are up-rooted, using sharp spades or other tools, most roots break and tear. These tears result in water loss and disease can easily enter the plant.

- Trimming and stripping: The tears in the roots should be tidied by cutting off the tears neatly with a sharp knife. Old leaves at the bottom of the seedling should also be stripped immediately to reduce water loss through evaporation. Some trees such as *Azadirachta indica* (neem) and *Khaya senegalensis* (african mahogany) should be stripped of all leaves except the terminal bud at the top of the plant. *Cassia siamea* and *Gmelina arborea* can be cut back to 5-15cm above the ground line. This is know as stump planting. **It is vital to find out what treatment is appropriate for which species.**



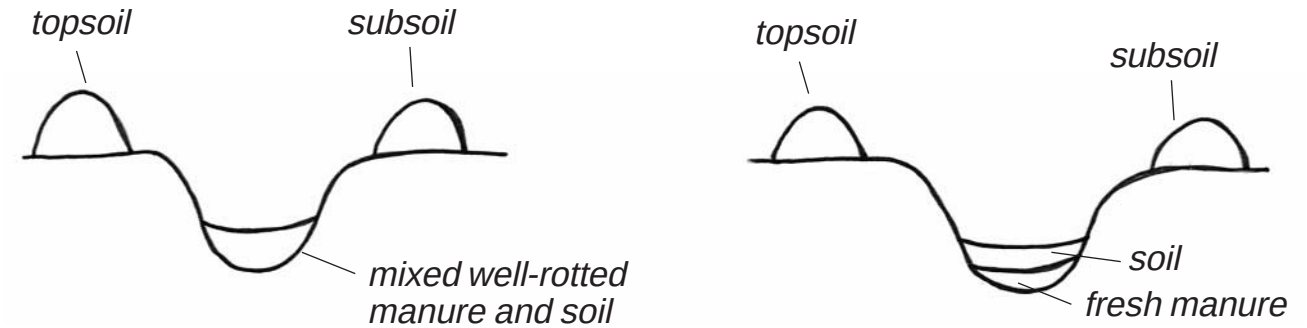
- Packing: Bare-rooted seedlings must be placed into a mud pack for transport to the planting site. To make the mud, dig a hole and mix pure clay soil and water to make a slurry. Dip the seedlings in this mixture, coating them well. Wrap up several of these in folded piece of cloth, sacking, banana leaves or other appropriate material. Tie the bunch securely. Water this bunch lightly and store in the shade. If the trip to the planting site is long, re-water the mud packs.



Preparing the planting holes

1. Dig holes 40cm by 40cm and 40cm deep, and break up the soil at the bottom. When digging the hole put the topsoil on one side and the subsoil on the other side of the hole.

2. Mix some soil with some compost or **well rotted** manure and sprinkle it in the hole. If the manure is fresh, put it at the bottom of the hole and cover with soil. This will ensure that the delicate roots are not burnt by the fresh manure.



3. Fill the hole up to a quarter full with water.

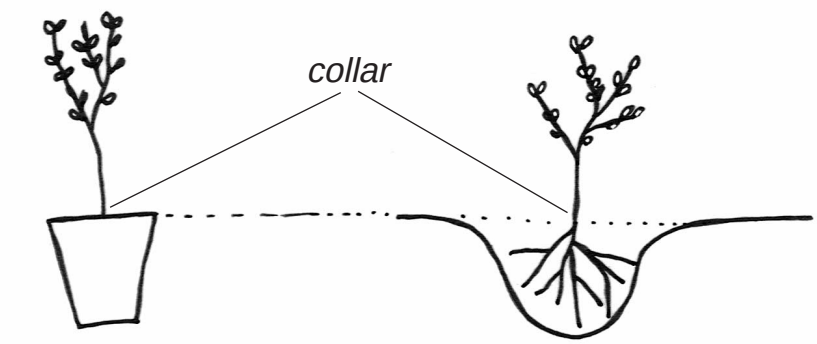
4. Weed thoroughly about 1m around the hole to avoid competition for light and water.

Planting out

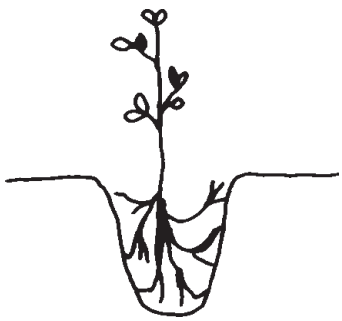
Remove the plant from the pot or mud-pack. If you have an earthenware pot, put one hand over the top of the pot with your fingers spread and turn the pot upside down with your other hand. Gently shake the pot to help the seedling out. If you have a polybag or a milk carton, cut them off using a sharp knife or scissors. If you have a bare-rooted plant from a mud-pack, try to keep as much soil around the roots as possible.

For potted plants, hold the rootball in your hand, trying to keep the earth together. Look at the rootball of the tree. If the roots have circled around the bottom of the pot, pull out the roots gently so that they are free. If the roots are very severely entangled, carefully prune the roots again.

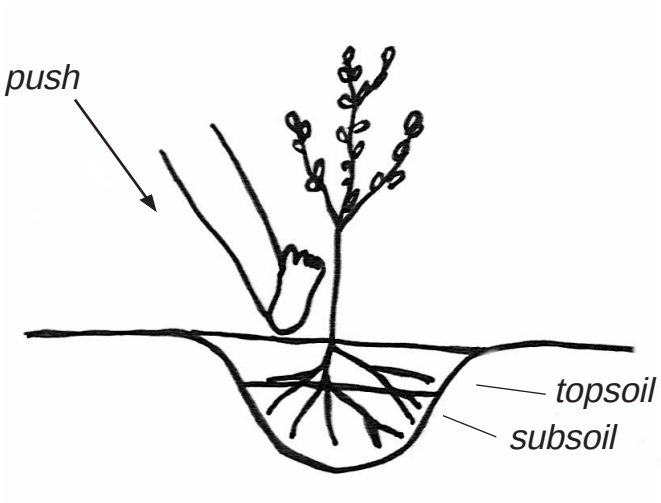
1. Find the collar. The collar is the place where the stem came out of the ground.



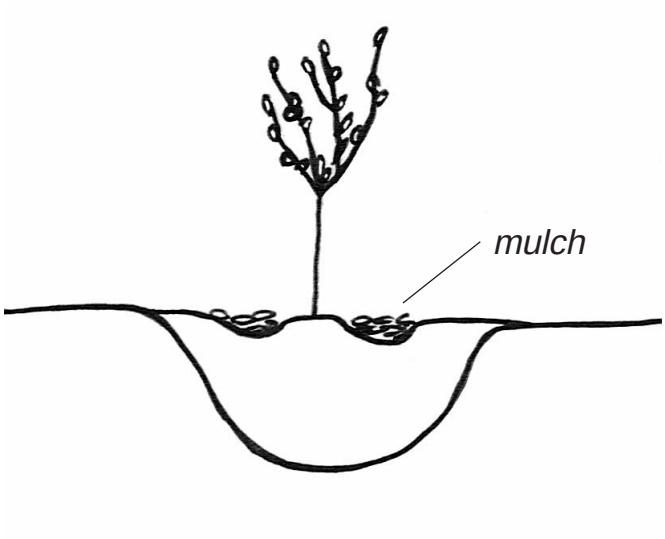
2. Place the seedling in the hole so that the collar is at ground level. **Make sure that the roots are not turned upwards.**



3. Fill with earth. Fill firstly with subsoil and then with topsoil. Make sure that the earth is well compacted by pressing with your foot around the base of the seedling. This process can be done with two people, one holdling the seedling straight and ensuring the collar is at the correct height. The other person can be filling in with soil.



4. Make a dip 10cm all around the base of the tree and fill with grass clippings, leaves, straw, pebbles or stones. This will help to conserve moisture. Then water the plant thoroughly.



Aftercare

Protection

Protect your seedlings from wild as well as domestic animals by using a fence or thorny, wooden or bamboo structures.

Weeding

Weed around seedlings regularly to prevent competition for water. These weeds can be added to the mulch around the base of the seedling to conserve moisture.

Watering

To survive, newly planted seedling need to be watered in the few days after planting.

In very dry areas, with less than 250mm annual rainfall watering may be necessary. If the rain does not arrive when anticipated, watering during the first few weeks of establishment will also be necessary.

To ensure that the best use is made of the water, you can put a bottle or jar with a hole at the bottom in the ground next to the seedling. This means that the water goes where it is most needed; to the rootball.

Shading

Erect temporary shade for especially valuable seedlings or for seedlings that have not been hardened off properly. This can be as simple as two large leaves (coconut, banana) pushed into the ground and leaning against each other.

Micro-catchments

Micro-catchment strucutres are inexpensive ways to encourage seedling establishment and growth in areas where agroforestry would seem impossible. These structures make the best use of rainfall. They can, however, be labour intensive if carried out over large areas.

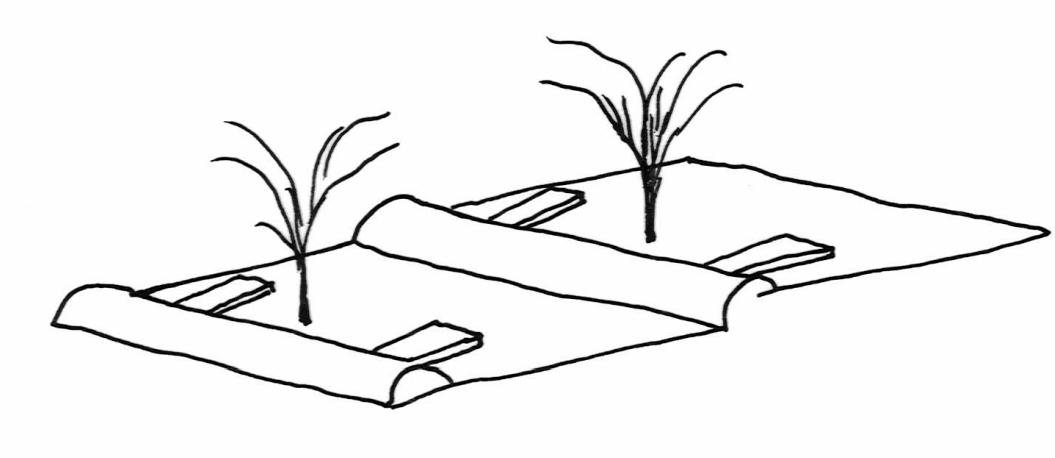
U or V shaped micro-catchment

A U or V shaped trench should be dug and the earth should be made into a small wall surrounding the trench. A deeper pit should be dug in the corner of the trench.

The size of the micro-catchment varies between 10 and 100 square meters depending on rainfall and the species of tree to be grown.

Contour bunds for trees

A contour bund for trees is more simple than a micro-catchment. The bunds are built along contours at close spacing (5 to 10m). Small earth walls are built 20 to 40cm high and 2m long.



Reference list

‘**Reforestation in Arid Lands**’ (1986) F R Weber and C Stoney. Volunteers in Technical Assistance, 1815 North Lynn Street, Suite 200, Arlington, Virginia 22209, USA.

‘**Agroforestry Technology Information Kit**’ (1990) International Institute of Rural Reconstruction, Room 1270, Riverside Drive, New York 10115, USA.

‘Forest Tree Planting in Arid Zones’ (1976) A Y Goor and C W Barney. Ronald Press, New York, USA.

Notes

Notes

Further information on tree planting, agroforestry and methods of organic farming can be obtained from HDRA.

The Tropical Advisory Service
HDRA - the organic organisation
Ryton Organic Gardens
Coventry CV8 3LG
UK
Tel: +44 (0)24 7630 3517
Fax: +44 (0)24 76623 9229
Email: ove-enquiry@hdra.org.uk
Web site: http:\\www.hdra.org.uk

The aims of HDRA are to carry out scientific research into, collate and disseminate information about, and promote interest in organic gardening, farming and food in the UK and overseas. For more than a decade, HDRA's international programme has been involved in the support and extension of sustainable farming practices; supporting research on aspects of tropical organic agriculture, providing advice and literature on appropriate organic techniques and providing tree seeds and technical information to organisations involved in tree planting and research.