



Chapter 7: Outplanting Seedlings



Outplanting seedlings into the Forest Garden is a relatively simple procedure. To give the young seedlings the best opportunity survival however, be sure to follow the measures, techniques, and timing recommendations below.

Timing of Tree Planting

Timing is an extremely important consideration when outplanting trees into the Forest Garden, particularly when you are not able to irrigate the trees regularly after planting. To take advantage of natural irrigation, i.e. rain, plant your trees at the beginning of the true rainy season. Rainy seasons can be short and unpredictable, however. To increase the likelihood that the true rains have begun it is important to wait until two weeks of 3 or more significant rain events have passed before planting your seedlings. Do not delay planting after the true rains have begun as the seedlings will benefit from as much rain as possible to help with root establishment, increasing the likelihood that they will survive the oncoming dry season.

Timing of Tree Planting – The beginning of the true rainy season

Wait until two weeks of 3 or more significant rains events have passed before planting your seedlings.

Be sure your seedlings are ready for planting at the start of the true rainy season. Delaying further into the rainy season decreases the likelihood of survival.

Keep a close eye on your seedlings after the rains end, particularly if the rains are short. If the seedlings start to wilt excessively, and do not recover overnight, then you will need to irrigate them with 3 to 5 liters of water (depending on the size) one time per week for each seedling.

Prepare Your Planting Holes

Before removing your seedlings from the nursery for transplanting it is good practice to first dig your planting holes. It is best to do this at the time you expect the rains to begin, at least two weeks prior to actually planting the seedlings.

1. Mark out where you will plant the seedlings, using your Forest Garden design as a guide and ensuring correct spacing for the species you are planting and, where

- applicable, the agroforestry technology for which you are planting.
2. Using a digging tool, dig a hole about two times the diameter of the tree sack or root system (for bareroot trees) you are planting. For agroforestry trees in sacks that are 8cm in diameter by 15 cm deep, for instance, dig the planting pit about 16 cm in diameter by 30 cm deep. For fruit trees in sacks that are 30 cm by 30 cm, dig planting holes that are about 60 cm wide by 60 cm deep.
 3. Where available, mix the topsoil you removed from the soil with well-decomposed compost or manure and line the pit with the mixture. It is important that the compost or manure be fully decomposed or the heat generated from decomposition may burn your seedling's roots. **Note:** If you do not have fully decomposed compost or manure, it is better to plant the seedling lined with topsoil, then place the compost or manure at the surface covered by mulch, so that the nutrients will slowly filter into the soil as it decomposes, mitigating the risk of the compost rotting or burning the seedlings' roots.

Extracting and Transporting your Seedlings

When you are confident the true rainy season has begun, it is time to extract your seedlings from the nursery and carefully transport them to the planting site. Be sure you have already hardened off your seedlings so that they are prepared for the harsher conditions beyond the boundaries of your nursery (see hardening off section). Follow the guidelines below for trees sacks (including agroforestry, fruit, timber, and any other seedlings raised in sacks), or bareroot seedlings.

Things to Remember Before Outplanting

1. Trees need to be tall enough to survive the shock of outplanting but not too tall that they can't be transplanted with intact roots. Before outplanting, trees grown in sacks should be 0.2-1m tall, and bare-rooted trees should be 0.5-1m tall.
2. Do not outplant trees with roots deeper than the planting holes you dug (which should be twice the depth of your tree sacks). Trim roots to this length, where needed.
3. All outplanting should be completed in the late afternoon to evening to reduce the amount of sun exposure and shock to the newly-planted tree.
4. Remember that unless you are able to thoroughly irrigate each tree every week, you should only outplant your seedlings during the rainy season when significant rain events are occurring at least twice per week. Plant early enough in the season to ensure plenty of time for root establishment for the dry season.

Tree Sacks

1. Water the seedlings thoroughly before removing them from the nursery. If the seedlings' roots have grown through into the soil below the sacks, be sure you water the seedlings well enough to soak and loosen the soil below.
2. Carefully pull up the sacks individually, using both hands for larger sacks. Try to maintain any roots that have penetrated into the soil below.

3. If the roots of the seedlings extend more than twice the depth of the sacks, carefully prune the long roots with a sharp, clean knife to twice the depth of the sacks, which should be equal to the depth of your planting holes.
4. Transport the seedlings to the planting site on flat surfaces, standing upright. If you do not have a wheelbarrow, carry what you can fit easily in your hands, or create a 'hand' barrow for two people with a wooden basket attached over two poles (see pic). Transport only the seedlings you plan to plant that day.
5. Place the seedlings upright in a shady area if you can, and plant them as soon as possible.

Bareroot Seedlings

1. Water the bareroot beds thoroughly before removing the seedlings.
2. Dig up bareroot seedlings, doing as little damage to the roots as possible. One method is to stick your spade deep into the soil close to the seedling row about 25 cm deep, move a few centimeters back, and do it again, removing a wedge of soil. Then stick the spade into the soil on the other side of the row, once again close to the seedling and "dump" the seedlings and surrounding soil into the wedge. Be sure not to let the seedlings fold over, breaking the stems.
3. Only remove enough seedlings to plant over the next few hours.
4. When dug up, cleanly trim the roots with a sharp knife if they extend beyond the planting holes you have dug.
5. Create a mud slurry with soil and water and dump it over the roots, thoroughly coating them to preserve moisture and wrap them in banana leaves or burlap sacks to prevent them from drying out. Do not store the wrapped seedling in buckets or any standing water.
6. Transport the seedling bundles to the planting site carefully and place them in shade if possible.

Outplanting your Seedlings

Tree Sacks

1. Carefully remove the seedling from the tree sack. It is helpful to use a knife or razor blade to slice vertically through the plastic.
2. After removing the plastic, gently massage the root ball to loosen it, particularly if the root system is wrapped up in a clump. If the taproots are coiled up at the bottom of closed tree sacks, carefully loosen them so that they are extended and facing downward for planting.
3. If the taproots in closed-bottom tree sacks extend deeper than the planting pit, carefully prune them with a clean, sharp knife to the depth of your planting holes.
4. Place the seedling in the planting pit that should already be dug.
5. The root collar of the seedling (the band that forms where the stem meets the root system) should be placed just the ground surface. If the planting pit is too deep, fill in some of the topsoil mixture you prepared when digging the planting holes. Be sure any extended taproots are pointing straight down in the hole.
6. Fill in the topsoil and compost mixture, compacting it firmly around the seedling,

but not too much so that it compacts the root system.

7. As the soil should be moist from the rains that recently began, there is no need to water agroforestry seedlings. If it does not rain for more than a week after planting, however, you will need to water them. For fruit, timber, and other more valuable or slower-growing seedlings, it is good practice to water each seedlings with about 3 to 5 liters of water immediately after planting them.

Bareroot Seedlings

1. Remove bareroot seedlings from the bundles one at a time, keeping the others covered.
2. Place the seedling in the planting pit, ensuring the ends of the tap roots are facing straight down in the soil. If you need to dig the pit a little deeper or prune the roots so that they face straight down, then do. If, when you plant the seedling, the tap root turns back upward in the soil, a 'J' root will form, which will lead to stunting and it may eventually die.
3. Crumble up the soil on the side of the pit and gently place it around the seedling's roots, keeping the root collar (the point where the stem met the soil in the nursery, above the roots) at ground level.
4. Pack the soil firmly around the root system, up to the root collar, to remove any air pockets, but not too tight.
5. Cleanly prune the leaves and branchlets on the stem, leaving only a few at the top of the seedling. This will encourage faster root establishment before stem and leaf growth.
6. As the soil should be moist from the rains that recently began, there is no need to water them. If it does not rain several days after planting, however, you will need to water each one.