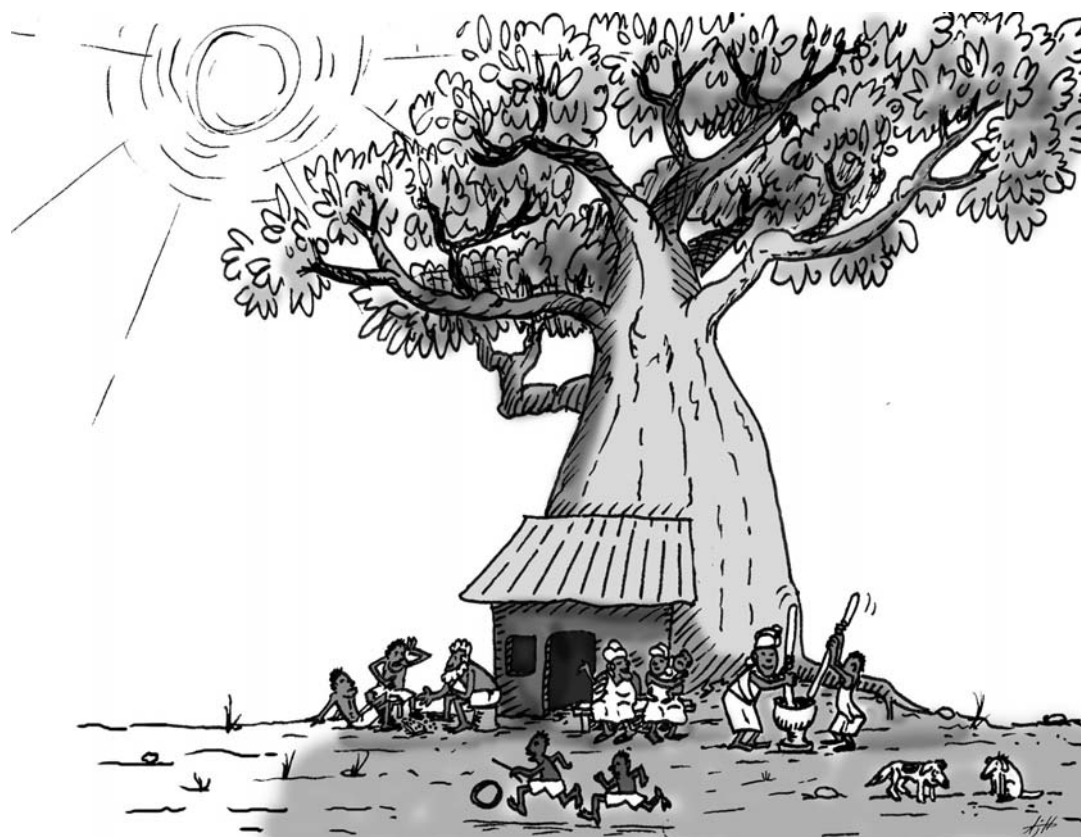


# TREE PLANTING

## What is this Action Sheet about?

Trees give us foods, spices, medicines, rope, as well as wood for tools, fuel, and construction. Some trees are so important to our survival that they are viewed as sacred. This Action Sheet is about how to grow trees.



*“A house is not a home without a tree”*

## Why plant trees?



Zambian agro-forester (Image: PACE)

- Farmers, gardeners and community groups grow trees for fruit, animal fodder and fuelwood. Growing trees protects the soil from wind and water and helps feed the soil by bringing up nutrients from deep below ground (See Action Sheet 35: Agroforestry).

- In the city, trees give shade and help reduce noise and air pollution.



Park in Johannesburg, South Africa, trees planted by Food and Trees for Africa (Image: PACE)

- Schools and environmental education centres plant trees to help people to learn about growing and caring for plants. They may also grow tree seedlings to give or sell to people in the local area.



*Lamu Tree Nursery, Kenya (Image: PACE)*

- Gardeners plant local species of tree to attract interesting birds and animals.



*George M'Gitonga, Kenyan farmer from Meru, runs a tree nursery business (Image: World Agroforestry Centre)*



*Red-billed Woodhoopoe in a South African garden (Image: Martin Heigan)*

- Trees can help entrepreneurs and community groups make money. Raising tree seedlings in nurseries and selling them can become a successful business

### **Can planting trees help save wild forests?**

Yes and no. No, because forests are natural ecosystems that have developed over many centuries and so planting trees cannot substitute for large areas of lost natural forest. Indeed, planting large areas with plantation forests destroys natural ecosystems and may have negative environmental effects.

Yes, because planting trees in cities, school gardens and on farms can help people realise the value of trees, so they are more willing to manage natural forests in a sustainable way. If people can find ways to cultivate useful indigenous species, it may be possible to protect the species in the wild. Harvesting fuelwood or timber from trees that have been grown for the purpose can help take pressure off wild resources. For example, Kenyan carvers in the Good Woods project now use wood from trees grown on farms, rather than wild timber (See Action Sheets: 47: Managing Forest Resources; 51: Neem).

## Which trees should we grow?

This depends on what you want and where you live. Observe nature! Find out which trees grow well in your area. Ask people what goods and services local trees already provide? What trees do people want more of? What needs could be met by growing trees? Action Sheet 50: Multipurpose trees could be a useful starting place. Talk to people who are already growing trees! Forestry Extension Officers, Agroforestry organisations, and Botanic Gardens will also be able to help.

When choosing which trees to plant, one important consideration is whether to plant indigenous or exotic tree species.

## What is the difference between an exotic and indigenous species?

Indigenous species have always lived in the area where they now grow. Exotic species have been introduced from another area, often another continent. For example, the neem tree is from India and *Gliricidia sepium*, a nitrogen-fixing tree useful for improving soils, is from South America.

There are many good reasons for planting indigenous trees:

- Loss of biodiversity is a critical issue in Africa. Planting indigenous species of tree can help protect threatened species. If people can find ways to cultivate useful indigenous species, it may be possible to protect the species in the wild
- People already have useful knowledge about indigenous trees and they may already know how to look after these trees so they grow well
- Indigenous trees are best adapted to local climate and soil conditions, so they are more likely to grow well and resist pests and diseases
- Many indigenous plants have medicinal uses. In South Africa, specialist nurseries like the Silverglen medicinal plant nursery, grow medicinal species that are now endangered in the wild
- Indigenous trees are good for birds and wildlife, which may help to control insects on the farm
- Indigenous plant species help maintain the natural balance of ecosystems. Exotic species may escape into the wild and become weeds, growing where they are not wanted and competing with native plants. Alien invaders in Africa include *Leucaena leucocephala* and *Prosopis juliflora*, and worst of all, water hyacinth (see Action Sheet 29)

Nevertheless, many exotic species are so useful that people still wish to grow them. Some introduced species, like the neem tree, have been in Africa for a long time, so with long experience, people can say that they are safe and will not invade.

## How to get started with tree-planting?

Trees start life as seedlings.

Seedlings can be grown in four main ways:

- From seed
- From stem or branch cuttings (large branch cuttings are called truncheons)
- From root cuttings
- By transplanting wild seedlings



(Image: Sarah Watson, PACE)

Once you've chosen your trees, you need to find out which way of growing is easiest for that kind of tree. You can find out which way is best by asking local people, using a resource book, trial and error. Some guidelines for useful species can be found on Action Sheet 50: Multipurpose trees.

Some trees can be planted directly in the place where you want them to grow. However, many seedling trees need to be looked after for several months, before planting them out to the place where they will stand. If you are planning to grow lots of trees, then you will probably want to set up a tree nursery where you can grow and look after your young seedlings.

### What is a nursery?



*Chyulu Nursery, Kenya  
(Image: Sarah Watson, PACE)*

A nursery is a place for growing and looking after young plants. When they are ready, seedlings can be sold, given away or planted out where they are needed.

Nurseries can be big or small, run by one person or a group. They can be a business, or an individual or community project.

If you are planning to start up a nursery for a business, you will need to assess the competition. There may not be enough customers for more than one nursery in a small town.

### Where should we put our nursery?

- A place as close as possible to a source of water
- A place with good soil
- A place with the right amount of space for your plans
- A place with plenty of morning sunlight and some shade. In Southern Africa, a north-facing slope is best.
- A well-drained level place, or a place with a gentle slope to help with drainage
- A place protected from strong winds
- A place that people can easily get to

### Who will own the nursery?

If the nursery is to belong to your family or school, then this will probably be a simple question to answer. However, if the nursery is to be run as a business, you need to form an organisation that will own the nursery, so that everything is clear from the start. Set up a meeting with all the people who will be involved in the nursery to decide who will belong to the ownership committee, who will do what job (chairman, secretary, treasurer, planting, office-work), who will be paid and how much. Be sure to keep minutes of all meetings of the organisation (the date of the meeting, who was there, who said what).

### What do we need to set up a new nursery?

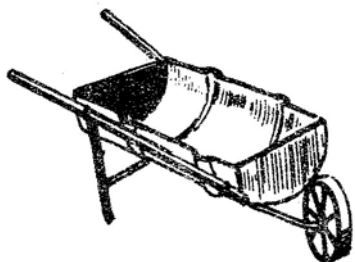
#### *Enthusiastic people:*

The more commitment and support you have from the people involved in a nursery project, the easier it will be. If you are setting up a school nursery, everyone – pupils and teachers – should be involved right from the start. Pupils can participate in planning the location, preparing the ground and building shade-covers, planting seeds and looking after plants.

### Equipment:

Spades, wheelbarrows, hoes, picks, string, tape, labels, watering pots, sticks, stones, straw, mulch, thorn branches.

You could start by making these items yourself, or you could see what people will donate.



(Image: Food and Trees for Africa)

- A wheelbarrow can be made from half an oil drum.
- Plastic bottles can make good spades or watering cans.
- Old tins, jars or egg boxes can be used for seedling trays or containers (Punch holes in the bottom).

### The raw materials:

**Wild seedlings and cuttings:** Look around where you live. You may find young plants close to trees. These have grown from root suckers or seeds that have fallen from the tree. With permission from the landowner, you could transplant some of these to your nursery. As long as you do not take them all, and do not harvest plants that are endangered and protected by law, this will do no harm as most of them will die in competition for light. It is best to do transplant wild seedlings early on when they are yet to develop larger tap-roots. Cuttings from branches can also be grown. If you are making a cutting from a root sucker, you may need to cut it away from the parent root underground. Make sure you have permission from the owner of the land and take care not to damage the parent plant.

### Seeds:

Collect your own seeds from the ripe fruit of local trees. Fruit or seed pods that are ripe and ready to be planted may fall off the tree and split open when they hit the ground, shooting out the seeds. Find out when useful tree species flower and go on a collecting expedition. This is probably the best source of seeds – it's cheaper than buying seed and the trees you grow will already be adapted to the climate and soil in your area. To make sure the seeds you have collected germinate (start to grow) and grow well, be sure to:

- Choose healthy-looking trees to collect seeds from.
- Collect seeds from more than one tree, so that your seeds will have natural genetic variation. This means that later, when the seeds have been planted, you can select the healthiest seedling.
- Store collected seeds in a porous bag or sack
- Have a good look at the seeds back at the nursery. Some seeds may have been damaged by insects. Seeds that will grow when planted look solid and full, and will not have any holes. Perform the float test. A good way to tell whether a seed is healthy is to put it into a container of water. Good seeds sink, poor seeds float.

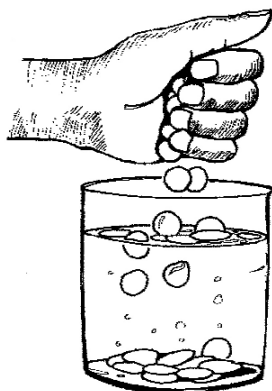


Image: Action magazine

Some useful tree species may not be available locally even though they may grow well in your area if planted. Contact your nearest forestry or agricultural officer to find out more. A list of seed supply centres is given in Action Sheet 56: Where to get tree seeds.

### Can we store seeds for later use?

Some seeds, such as those from acacias, need to be kept for a year before they will germinate. Fruit tree seeds should be planted straight away. Seeds can often be kept fresh inside a dry paper bag in a cool, dark place. See Action Sheet 46: Setting up a community seed bank.



*Acacia albida* seed pod  
(Image: by Alexi Francis)

### SEEDS

Seeds come in all sorts of shapes, sizes and colours. Some you can eat. Some are poisonous. Some are brightly coloured to attract a bird or animal's attention; other stick to fur; some are light enough and have 'wings' so they can float in the air; others float in water. The variety of different seeds depends on how they are spread from the 'mother' plant and where they grow.

All seeds are made up of the same basic structure:

A seed coat which protects

An embryo which is the baby plant

Food (endosperm) for the seed to use until it can make its own

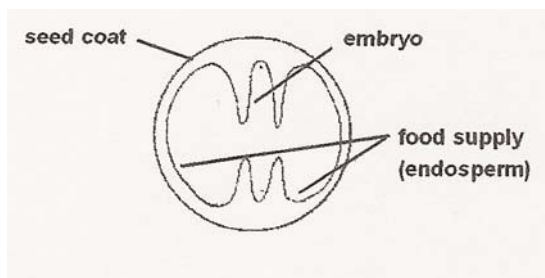


Image: Action Magazine

### How do we prepare seeds before planting?

Some seeds in nature will only germinate after a fire or after being chewed and eaten by animals. We need to imitate these conditions to encourage them to germinate. Ways to do this include:

- Making a cut in the hard outside cover (called scarification)
- Removing completely the outside cover
- Soaking the seeds in hot (not boiling) water overnight
- Heating seeds on the edge of a fire for a few minutes

Find out the best way to prepare each seed before you plant it. Books and experienced people will be able to help. Seed preparation guidelines for some useful species can be found on Action Sheet 50: Multipurpose trees.

## How should we plant our seeds?

You can plant seeds into seedbeds or containers. You will need to have a shade-house or shady place to keep containers, and somewhere you can move them to out in the sun. If you are growing many tree seedlings to sell or give away, it might be easier to make a seedbed outside. In this case you will need to build a shade-cover with a removable roof.



Nursery shade house, Kenya (Image: PACE)

- Prepare a potting soil - One part sand, two parts compost/manure, two parts top soil. Two or three handfuls of wood ash for every wheelbarrow of soil will help feed the seedling.
- Put the potting soil in to a seedbed or container (leaving a space at the top of the container for water)
- Put the seed its own height below the surface of the soil
- Water well with a fine spray of water and put mulch on top
- Label the container or seedbed

Once planted in soil, seeds need moisture, darkness and warmth to germinate. Seedbeds and containers need to be kept under shade cover. After a few weeks, you should expect to see seedlings poking through the soil.

## How can we look after our seedlings while they grow?

- Shade containers and seedbeds from the sun for two months.
- When seedlings are old enough, move them to a place with lighter shade and make sure they are getting enough sun during the day! Plants need light to grow!
- If you live in a place where the nights are cold, you may have to put a plastic bottle cover over the seedling containers when they are young. This helps to keep the heat in, but still allows light through. At some point, the seedlings need to learn to survive without any covering. This is called “hardening off.” Starting in the late afternoon, the plastic cover should be taken off for one hour the first day, for two hours the next day, and so on until the plant can survive a whole night and day without its cover.
- Protect from animals: Fence out goats, rats, sheep and cattle
- Protect from termites: Termites hate wood ash!
- Protect from fire: Make a firebreak around the nursery
- Protect from cold: Apply mulch around the seedlings but do not cover them. Mulch protects the soil like a blanket. It prevents weeds from growing, helps water get to the plants, and keep the soil warm (See Action Sheet 34: Mulching)
- Protect from weeds: Weed seedbeds regularly. Pull weeds out by the roots when they are still small. Don't let weeds make seeds! Pull them out before they flower. Avoid disturbing the tree seedling when weeding – hold the soil around the seedling down with one hand while you pull out the weeds
- Protect from each other: Don't let the seedlings get overcrowded. Pull out weaker, sick or dying plants to make more space for the strong ones.

## How often should we water our seeds?

- Keep the soil damp until the seeds germinate
- Water daily afterwards
- Test the soil before watering. If it sticks to your fingers, it is wet enough. Do not water that day
- Plants need more water in hot summer weather.
- Don't over-water! It can kill the seedling. You will know you are over watering if you get green algae or moss (green slime) growing on top of the soil
- Water gently next to the base of the tree, until the water runs out of the bottom of the container. Don't splash the leaves
- In the cold season, make sure watering is finished by lunchtime. Never let your tree go to sleep with wet feet! It can cause disease and makes it easier for frost to kill the plant

## When should we transplant our seedlings to where we would like the plant to grow?

- Transplant seedlings from containers when they have become as big as their containers. Transplant seedlings from a seed bed when the first two sets of leaves are open.
- Transplant seedlings on a cloudy day, and never in the sun at the hottest part of the day.

## How should we transplant seedlings?



*Food and Trees for Africa project – Planting trees in Siyathuthuka Park, Soweto, South Africa (Image: PACE)*

- Prepare the ground, removing unwanted plants
  - Always keep bare tree roots damp while planting
  - Dig a hole large enough to take the roots and some compost
  - When planting, spread the roots and fix in soil or soil/compost mix, firming well as you progress; do not add soil above the previous soil line on the stem.
  - Prepare a hole where you want to plant the seedling
  - Carefully dig around the roots of your seedling.
  - Hold the seedling by its leaves and gently lift the roots out, supporting the ball of soil around its roots.
- Plant the seedling into the hole without bending the roots
  - Plant the seedling so that only the first two leaves are above the ground
  - Firm the soil down around the seedling



## How to look after trees whilst they grow?

After planting out, it is important to care for the tree as it grows. You need to make sure your tree has enough water and is not in competition with other plants for food

Keep weeding around the tree whilst it becomes established

Mulch around the base of the tree. Spread a layer 3cm thick on top of the soil, but do not let it touch the stem of the tree. Renew the mulch every six months

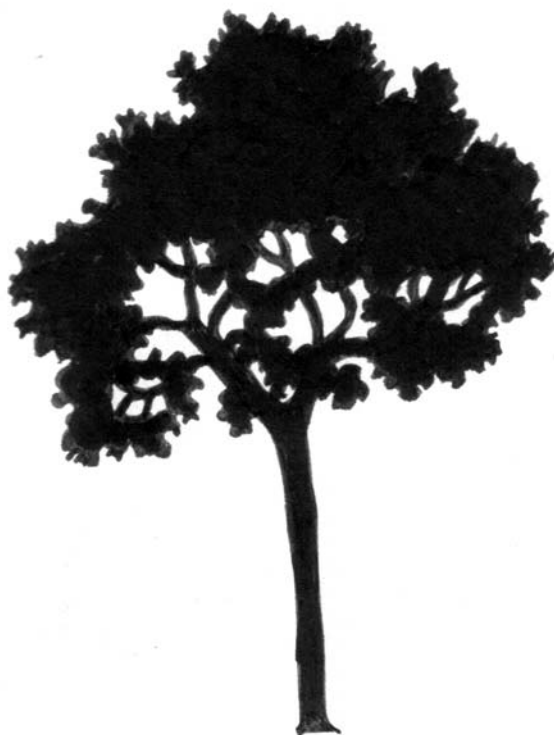
Feed the growing tree through the soil by adding compost, bone meal, or manure tea. If you use mineral fertilizer, be sure to follow guidelines for use carefully

Water every day for the first two weeks after planting. After that, check the tree daily and water as required. Make a water drip can or bury a clay pot full of water next to your young tree. See Action Sheet 44: Buried clay pot irrigation

When seedlings are about 30cm high, they need to be staked (supported by a straight stick). This will help them grow straight and stop them from falling over. Put the bamboo cane or stake in about 2cm away from the tree on the windward side and secure the tree to it with a strap made of soft material (an old inner tube, strip of cloth). Never use wire or string as it may bite into the tree and damage it. Allow the top of the young tree to move freely in the wind - this is vital as it helps to build up strength in the tree against strong winds in its later life

Make tree guards to protect growing trees from wild animals. Plastic bottles can make a good guard for the stems

Pruning: To make a good shade tree, all side branches should be cut off the tree until it is one and a half metres high. At one and a half metres high, you can start to allow the tree to make side branches. Use a sharp knife or secateurs to remove the side branches. Don't pull them off as this will damage the tree

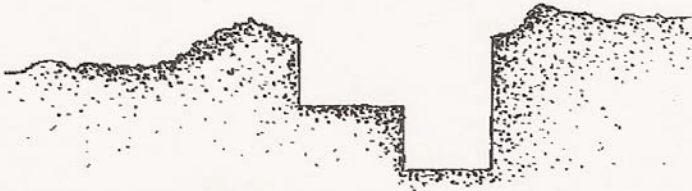




## Make a water drip can

Finding water and carrying it to a tree that you have planted is a big problem. So we need to make sure that none of it is wasted, for instance through evaporation. Using a drip can will help your seedling to grow well by giving it an even supply of water.

### ACTION



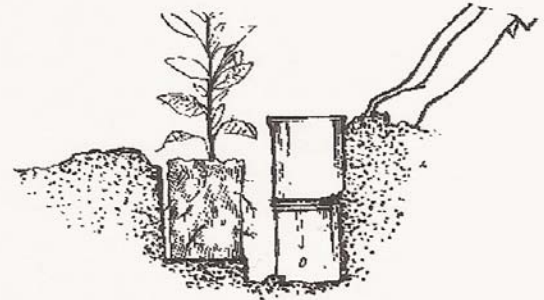
1. Dig a hole with one side slightly raised.



2. Find tin cans or plastic containers and make small holes in the bottom of them.

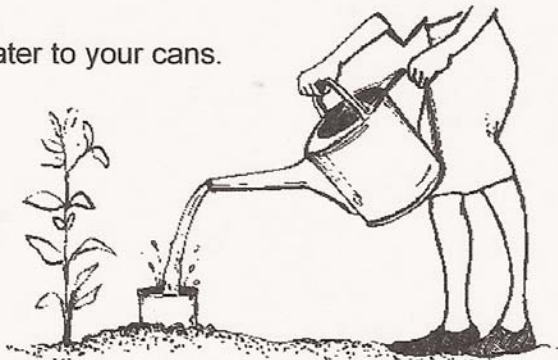


3. Plant the seedling on the raised side.



4. Place the cans on top of each other in the hole so that the top is just above the ground. Fill in the hole with potting soil. Make sure the base of the drip can is below the seedling. Fill in the hole with potting soil.

5. Add water to your cans.



6. Cover the top to prevent evaporation.

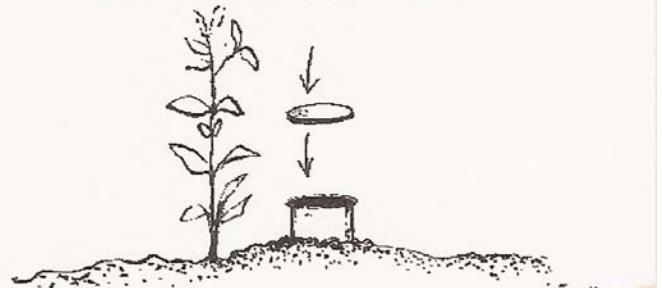


Image: ACTION Magazine

## How do you plant a cutting?

- Some species can be grown from cuttings taken towards the end of the growing season
- Select a healthy shoot from the current year's growth
- Cut a straight 25cm section directly above a bud at the top and below a bottom bud. Clean the leaves off the cutting, leaving only four at the top
- Bury two thirds of the cutting into free draining soil or sand
- Water regularly
- Plant several cuttings at a time, to make sure at least one survives
- If available, cuttings can be dipped into root hormone mixture to help rooting

Some trees can sprout from truncheons (thick cuttings of 70 – 150mm in diameter and 2-3 metres long). Plant lots of truncheons in a row to make a living fence.

## How can we protect nursery plants from pests and diseases?

- Check trees every day for pests and diseases. Plants that are being attacked by pests are usually weak. Perhaps they need more light, more water or some plant food like compost or manure tea. Or perhaps they are getting too much light, or too much water. Solving these problems will make the trees more able to resist infection by pests and disease.
- Aphids are a common pest of trees. They are little green or brownish black insects that eat the sap of trees and make the leaves of trees curl up. Spray them with 1 teaspoon of green dishwashing liquid in five litres of water. Keep spraying every day until they are all gone. Mealy bugs can also be sprayed with soapy water.
- Pick grasshoppers, locusts and worms off the trees by hand, tie them up in a bag and burn them.
- You could keep areas of natural habitat within the nursery to attract good insects – the natural predators that keep the number of pests down. For other ideas about ways to deal with pests and diseases, see Action Sheet 33: Natural pest and disease control. If these do not work, you may need to seek further advice about which pesticides to use, but do remember that pesticides contain extremely dangerous chemicals and must be used with great care.

## Apart from trees, what else can be grown in a nursery?

Shrubs for hedges and windbreaks (for example, vetiver grass), ornamental plants and flowers for gardeners and florists, as well as some vegetables (cabbage, onions) and many herbs all benefit from being grown in a nursery before being planted out.

**ACKNOWLEDGEMENTS:** This Action Sheet was compiled by Nancy Gladstone, based on information from the following sources: Action Magazine, Food and Trees for Africa - My Nursery ICRAF Vegetative Tree Propagation in Agroforestry, UNESCO-UNEP International Environmental Education Programme Environmental Education Series 21 Environmental Activities for Primary Schools Suggestions for Making and using low cost equipment Produced by the International Centre for Conservation Education for UNESCO International Environmental Education Programme Indigenous Plant Propagation, EEMAIL Vol 2 Number 1 Dec 1999 Kish Bhurton (from Mauritius) and Josephine Mremi (from Tanzania World Agroforestry Centre. Original cartoon by Alan Hesse.

## FOR FURTHER INFORMATION

### CONTACTS

Food and Trees for Africa: [www.trees.org.za](http://www.trees.org.za)  
World Agroforestry Centre: [www.worldagroforestry.org](http://www.worldagroforestry.org)  
Action Magazine: [www.action.co.zw](http://www.action.co.zw)

### BOOKS

My Nursery: How to set up and run a community nursery by Food and Trees for Africa and Landcare South Africa  
This booklet has lots of information on running a nursery as a business

### Attracting Wildlife to your Garden in Southern Africa

Peter Chadwick and Roy Trendler

This book offers a wealth of valuable information and sound advice on:

- the principles of gardening for wildlife
- how to plan a wildlife garden and build a pond and wetland
- recommended indigenous plants and trees that will flourish in local conditions
- a guide to the numerous invertebrates, reptiles, birds and mammals that will visit eco-friendly gardens