

# Food for Life

## Foreword

It has become very clear that the first step to poverty alleviation is providing food security. Poverty is widespread and affects the lives of all in society. The Scout Association recognises that the key to addressing food security must come from the community itself. This raises some complex dynamics that often undermine the efforts of uplifting the community. Ultimately, food security lies in the hands of the available skills and only later the resources within that community. With an honesty of purpose the Association has recognised the strength of individual skills transfer. No effort has been spared in producing this programme where it is all about skills and the willingness to learn them.

It must be understood and accepted that this programme is for the individual. It has been developed to assist a willing young person (or adult!) to learn the skills of food gardening. It is this emphasis on the individual that lies at the very heart of the material. It **MUST** be the individual who learns, who chooses his or her partners, chooses which crops to grow and chooses how fast they want to learn. Ultimately the individual must have ownership and be allowed to empower himself or herself in acquiring the necessary skills. The "Food for Life" programme is intended to belong to the boy or girl with the guidance (but not interference!) of an adult leader. While fulfilling whatever obligations they may have it is also intended that all the benefits of their efforts belong to them.

The South African Scout Association is committed to serving the youth of South Africa. This is a great programme developed through the hard work of people and partners who have an intrinsic belief in what it can achieve. It is through this belief in the young people of today and through the willingness to give them opportunities and responsibilities, that their true potential will become apparent. This can change the world we live in and leave it in a better state than we found it.

All the contributors who assisted in making this project a reality are sincerely thanked!



Luke van der Laan  
Chief Executive Officer



# Introduction

Too many people are needlessly hungry! People, whether they live in towns or in rural areas, are not hungry because there is no food; they are hungry because they cannot produce their own food or have no money to buy it from others. Therefore small-scale food gardening has a great deal to offer the community.

All the nutritional needs of a family can be met with the produce of a tiny garden, 1,25 square metres in size (about the size of a small bedside carpet) for each person to be fed. Families that grow their own food save money, and can also make money.

Vegetable gardeners need never be hungry people.

This programme is divided into three phases:

- **Food for Life – Starter:**

The Cub/Scout will learn how to grow a vegetable of choice in his/her own garden.

- **Food for Life – Silver:**

The Scout will learn how to plant a variety of vegetables of choice in his/her own garden and also how to take care of the vegetables.

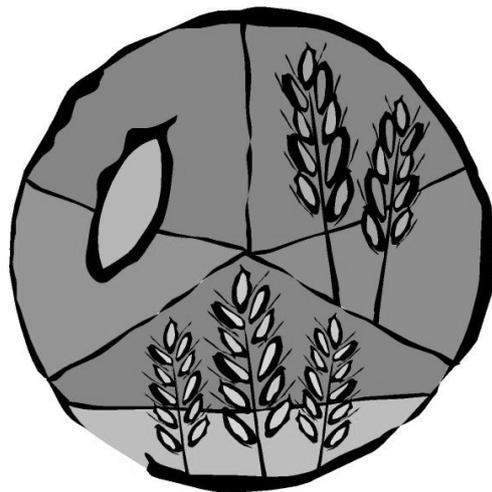
- **Food for Life – Gold:**

The Scout will learn how to draw up a business plan, and learn more about soil types, irrigation and fruit trees.

Keep a record of everything you do in your garden: what, and when, you plant, and when you make compost.



Food For Life Cub badge



Food For Life Scout badges

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# Food for Life – Starter



## Introduction

### Objective

Upon completion of this stage the cub/scout should be able to prepare soil, and grow and harvest one type of vegetable or fruit for his/her family.

## Badge Requirement

### Cub

To obtain the badge the Cub should be able to do all of the following:

1. Explain what the best place and size for a food garden are.
2. Obtain or make garden tools and explain how to use and look after them (rake, spade and watering can).
3. Prepare the soil, including mulching.
4. Sow seeds or plant seedlings.
5. Explain how to use water sparingly.
6. Harvest one vegetable or fruit.
7. Explain why vegetables and fruit should be eaten (nutrition).

Note: Container gardening is also acceptable.



### Scout

To obtain the badge the Scout should be able to do all of the following:

1. If the Scout held the Food for Life – Starter badge as a Cub he/she needs to do the following:
  - (i) Explain the contents of the badge to the examiner; and
  - (ii) Demonstrate one of the requirements.

OR

2. Do the requirements as for the Cub Badge.



## Suggestions for the Adult Leader

The following could be used by the adult leader to test the Scout:

- Show-and-do demonstrations of trench gardens can be done on the site.
- Show samples of harvested crops.
- Show a freshly dug trench, and demonstrate grass layering, etc.
- Show, on a blackboard or a display card, diagram of the trench method, as per the sketch.
- On another display card, set out “The secrets of success”.
- Provide a leaflet detailing how to prepare a trench garden, as explained in the Food for Life – Starter booklet.

# The best place for a food garden

Before choosing the site, spend some time observing your surrounding environment, noticing things like the sun, wind, rain, soil, slope, fencing, etc.

Ask yourself the following questions:

- **Where are the sunny and shady areas in your garden?**

Vegetables grow best in sunny areas, and need a minimum of four hours of sun daily, especially morning sun.

- **Is the site level or on a steep slope?**

It is difficult to grow vegetables on a steep slope. Rather choose a fairly level site. If the soil is very rough and uneven, it needs to be levelled and cleared by removing any rubble, stones and weeds.

- **Is there a water supply nearby?**

Vegetables require fair amounts of water to grow properly. Young seedbeds need water more than once a day. What type of water supply do you have and how near is it to where you would like to make your garden?

- **Is there lots of wind, and from which direction does it blow?**

Wind can damage vegetables by breaking them or burning the leaves. Wind also dries the soil out quickly. Are there existing buildings, fences or trees that can act as windbreaks, or do you have to make windbreaks?

- **Is the site protected from animals?**

Dogs can be very destructive to gardens, and cows can trample and eat your crops. Are there existing fences to keep out such animals, or do you have to make them?

- **Can you locate your garden near to your house?**

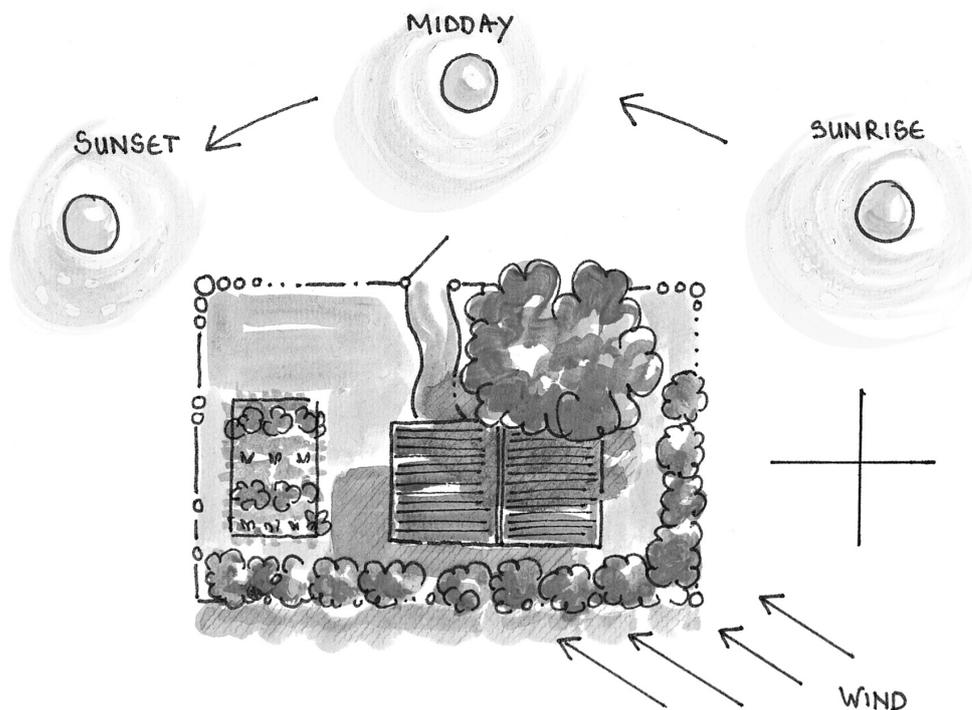
This will make it easier for you to watch and care for your vegetables.

- **What is the soil like?**

Is it free from concrete and rubble, and is it suitable for growing fruit and vegetables?



By answering the above questions, you will gather important information that is part of your planning process. It is good to write down your answers and to draw a plan of the area where you will be working.



You will now have a better understanding of how suitable the environment is, and what you need to do to improve it.

## How to protect your garden

You will probably need to protect your garden from animals and wind. To do this you can build a fence with sticks or nets around your garden. To protect your garden from wind, you can establish 'windbreaks' to stop the wind. This is done by planting trees, bushes or tall grasses or placing fences or objects on the side of the garden from which the wind blows. You can even plant fruit trees to protect your vegetables from the wind. The wind damages plants and dries out the soil. Other ideas for fences, not only as windbreaks but also to keep animals out, are:

- Sewing orange bags together and using sticks to make a fence;
- using branches of thorn trees or other trees; or
- planting thorny plants, cacti, aloes and prickly pears (you can then eat the fruit from your fence!).

If your garden is in an area threatened by bush fires, you can protect your vegetables by planting succulent plants (ones with fat, juicy leaves like aloes) to prevent fires from reaching them.

### Suggestions for the Adult Leader

#### Games to play

The windbreak game: take half of the cubs/scouts and arrange them in a line, standing close to each other. They are the 'trees' and 'plants' forming the windbreak, and must join arms. The other cubs/scouts should stand a short distance away and make loud 'wind' (blowing) noises. On the count of three they must run towards the 'windbreak' and try to break through them.

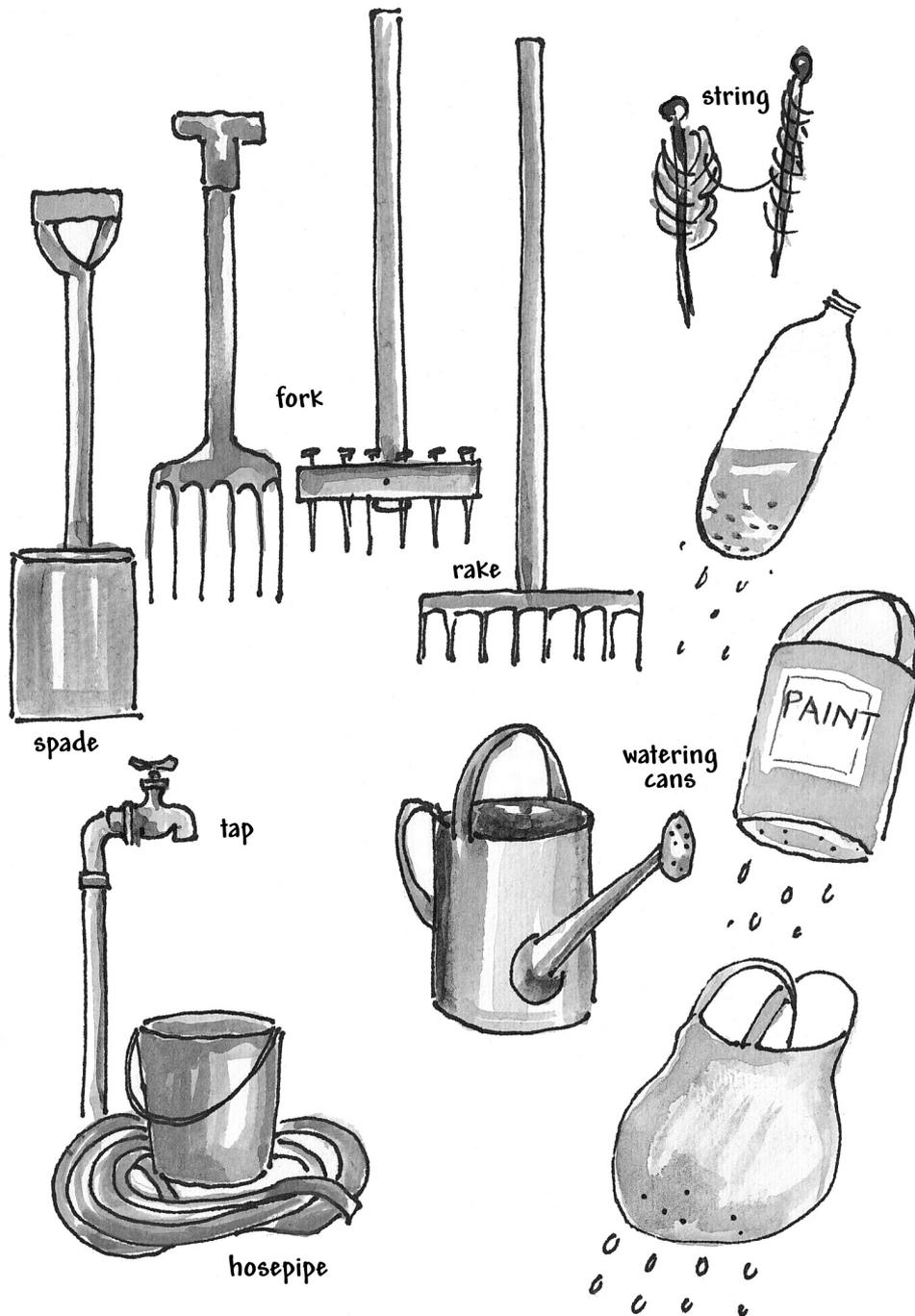


# Tools

The most important tools required for gardening are a digging spade, digging fork, hand spade and string and sticks. Other tools that can be handy are a rake, hoe, hand fork, shears, pliers, gloves, watering can and hose pipe.

You can make your own tools. Here are a few examples:

- **Rake:** hit nails through a piece of wood and fasten it to a broomstick.
- **Scoop:** attach a handle to a jam tin, or cut the smaller part off a 2l plastic cooldrink bottle.
- **Watering can:** punch holes in the bottom of a can or plastic bottle.



# Preparing the soil

Healthy soil is the basis for a successful garden. Soil consists of soil particles, sand, clay, as well as millions of very small life forms (micro-organisms) that are invisible to the naked eye. Micro-organisms need lots of food such as manure, compost and rotting plant material (organic matter). They then multiply and become food for plants.

## The trench bed method

The trench bed is made by digging a pit or trench in your garden. The trench is filled with organic waste material and compost.

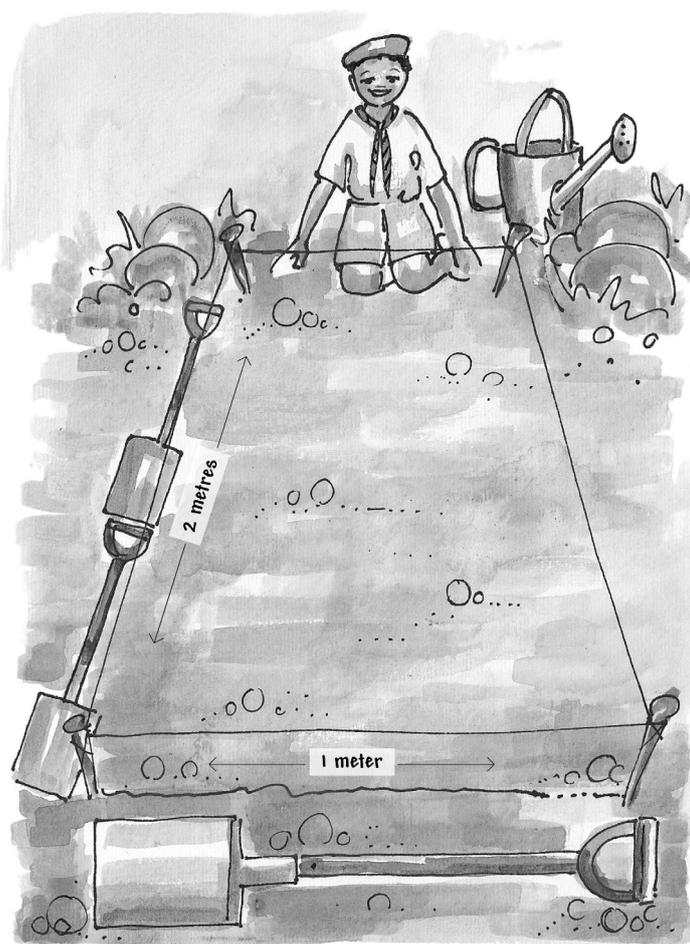
## Why make a trench bed?

- The trench bed method works well in preparing soil that is naturally poor and dry.
- It is a cheap way to feed the soil.
- The organic waste material acts like a sponge and holds moisture in the soil.

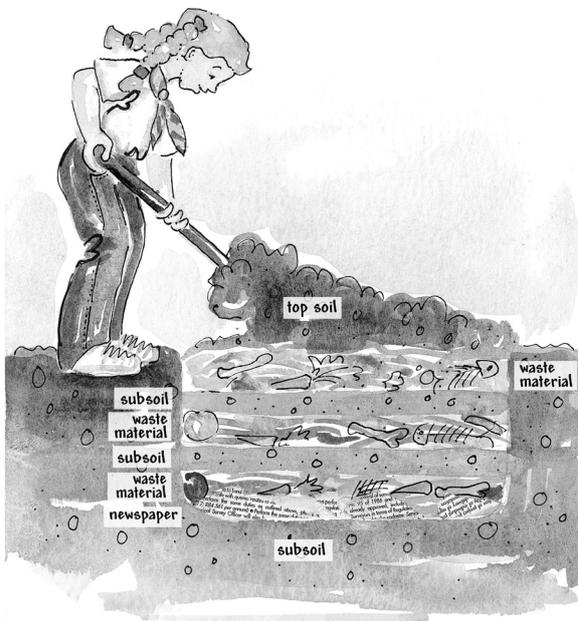
## How do I make a trench bed?

After you have decided on the best place to grow vegetables, you can start making your trench bed. Follow the following steps:

1. Remove all rubble and weeds.
2. Water the soil well the day before you start digging your bed, to make digging easier.
3. Measure the bed, out using sticks and string (a good size is 1m by 2m). If you want a smaller garden, make it 1m by 1m; if you want a bigger garden make it 1m wide and longer than 2m. Do not make the width more than 1m! Rather make another trench bed and leave a space between the two beds so that you can walk between the two beds.



4. Dig out the soil on top to a depth equivalent to the length of a spade blade (30cm). This soil is called topsoil. Put it on one side of the trench.
5. Carry on digging until the trench is knee deep for an adult (at least 45cm deep). The soil you have now dug out is called bottom soil or subsoil. Put it on the other side of the trench.
6. Cover the bottom of the trench with newspaper or pieces of cardboard to stop water draining out of the bed. Water the bed well.



7. Throw a layer of waste material into your trench. If you have fresh manure it would be good to mix it with the waste material. Water it well. Then add a thin layer of subsoil. Continue adding layers of waste material, fresh manure and sub-soil until there is no more sub soil left, watering well after each layer. See the section on composting for all the types of waste materials you can put into your trench bed.

8. Lastly, put the topsoil back in the bed and level it, using a rake or fork. The new bed will be slightly higher than the ground level.
9. If you have manure or compost, spread at least two buckets per m<sup>2</sup> (1m by 1m) thereof over your trench bed and dig it into the topsoil. Then use a rake or fork to level the bed again. (The scout will learn how to make compost in Stage 2).
10. Your trench bed is now ready for planting. A good trench garden can feed a small family for up to two years before reparation of the existing bed is required.



# Container gardening

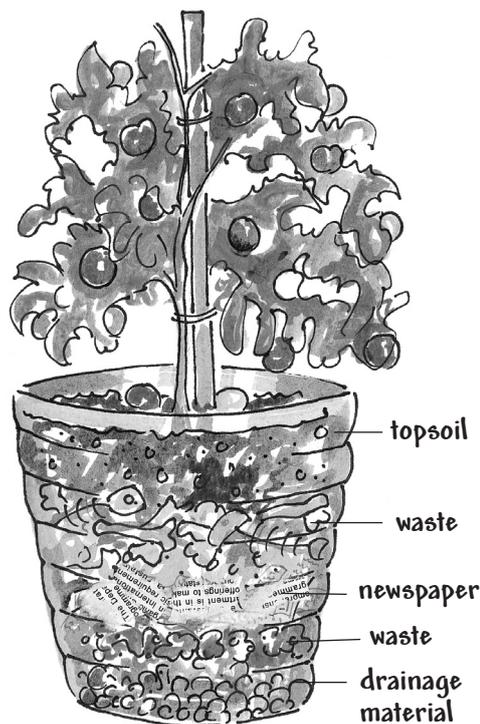
If you do not have a big enough space to make a food garden, you can grow vegetables or fruit in containers.

Remember that plants in containers need more water than those planted in the soil. You can check the moisture in the soil by scratching with your finger to a depth of 3 to 5cm.

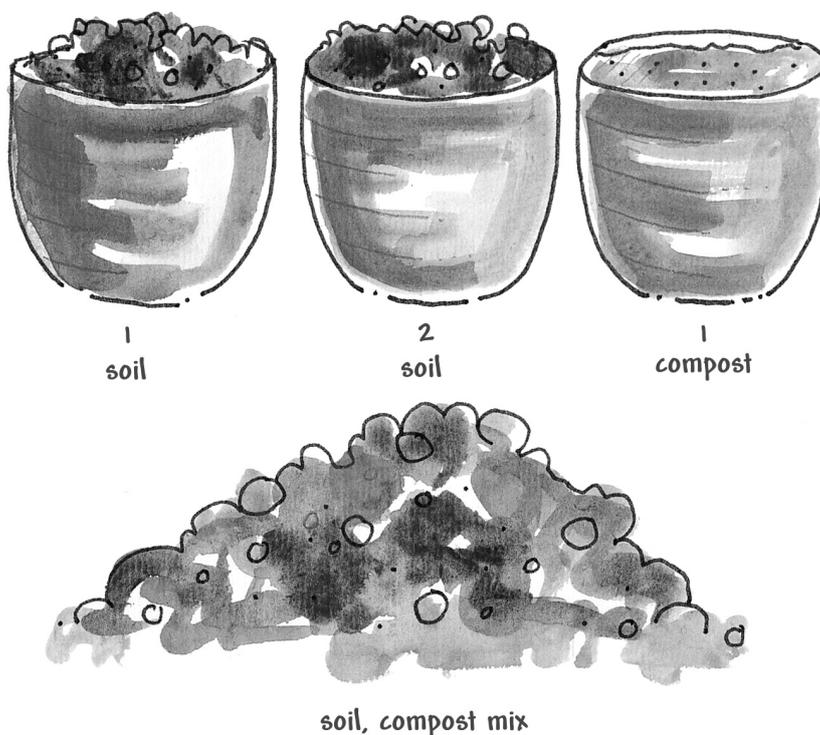
You can use any type of container – tyres, wooden boxes, milk containers, plastic bags, mealie bags, an old bath or sink, etc.

If you decide to use containers, you should do the following:

- Put a layer of small stones, approximately 1 to 2cm deep, at the bottom of the container for drainage.
- For larger containers: put alternate layers of waste and soil in the container as was explained in the section on trench beds above. Then put a layer of topsoil on top.
- For smaller containers: mix two parts soil to one part compost.



## Making a soil mix



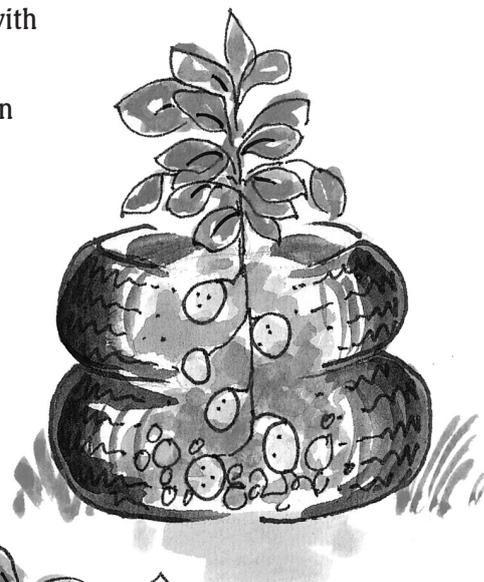
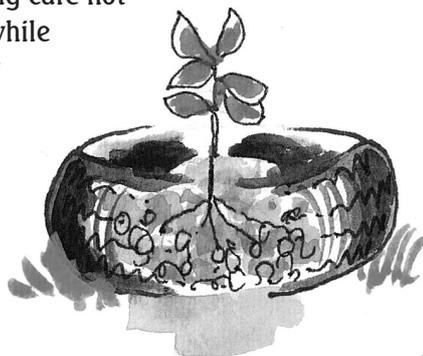
- Plant the seedling or seed and water well.

The following vegetables grow very well in containers: beans (climbing), beetroot, broccoli, cabbage (small-headed), carrots (short-rooted), cucumber, eggplant, lettuce, peas (climbing), peppers, potatoes, radish, spinach, tomatoes and turnips.

Strawberries grow very well in containers and all types of herbs can also be planted in containers.

If you are planting potatoes in tyres, it is advisable to use more than one tyre, as you will be able to harvest more potatoes by doing so.

- Place a car tyre on the ground in a sunny place. Fill it almost to the top with well-composted soil.
- Put one to two sprouted seed potatoes in the soil and cover with about 5cm of soil. Water well.
- Keep the soil damp. When the shoots appear and have grown about 10cm above the top of the tyre, put another tyre on top of the first one and gently fill it with well-composted soil, taking care not to break the plants while doing so. Cover only the stem with soil, not the leaves. Feed the plants with a liquid fertilizer. Keep the soil damp.
- When the plants grow through the soil again, put on another tyre on top and fill it as above. Feed with a liquid fertiliser again. You may be able to put two tyres on top of the first one before the plant starts to flower. Keep the soil damp.
- When the plants have flowered and the foliage begins to turn yellow, you should harvest your crop.



## Replanting in Containers

You will have to add lots of compost, as the previous plants would have taken most of the goodness from the soil. Because of the possibility of soil diseases it is a good idea to rotate your crops. You will learn more about crop rotation in the second stage. You should replace the soil with fresh soil after two years.



# Seasons – when is it the best time to plant specific crops

Some vegetables grow best in cooler climates and some grow best in warm climates and some grow all year round.

The best time to plant vegetable gardens are in:

- Between December to February, for dry season crops.
- Between June to August, for cold season crops.

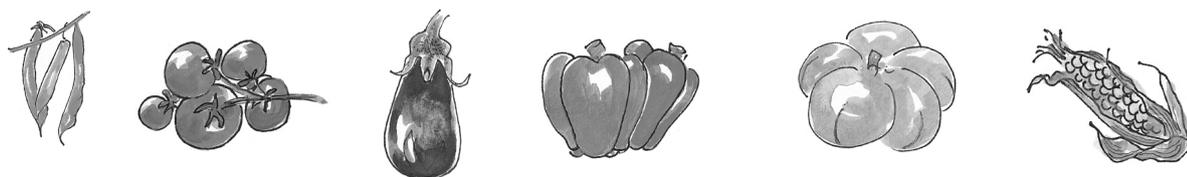
During these periods temperatures are mild, which is ideal for seed germination and the transplanting of seedlings.

It is best to start the garden as early as possible in the planting season, as this allows for early harvesting and the planting of follow-up crops.

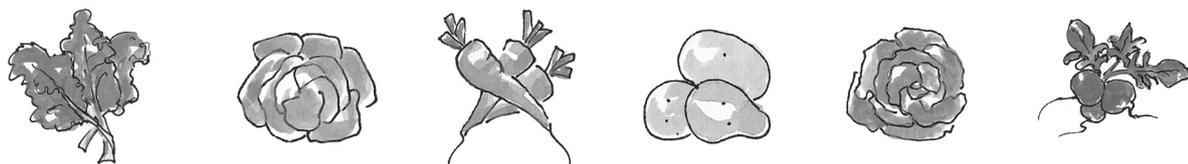
**Cold season crops:** cauliflower, broccoli, leeks, garlic, celery, broad beans, peas, onion, parsley and kale.



**Warm season crops:** beans, tomatoes, eggplant, green peppers, pumpkin, cucumber and maize.



**All year crops:** spinach, cabbage, carrots, potatoes, lettuce and radish.

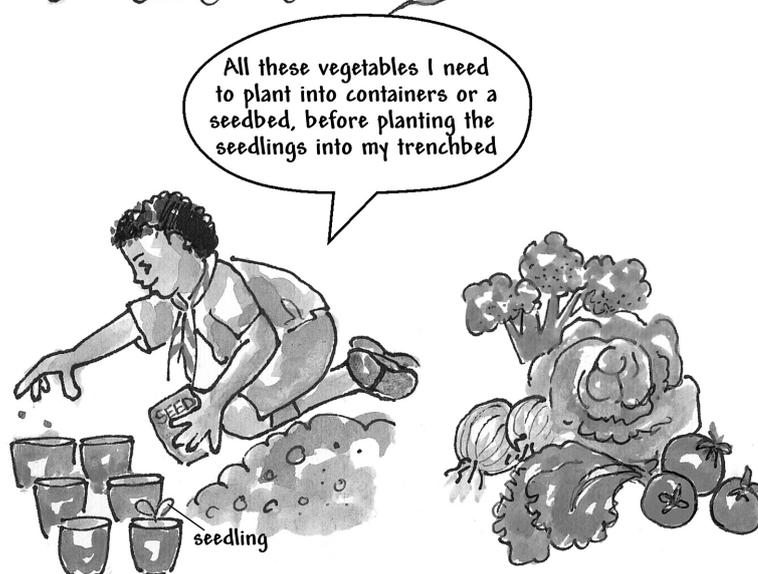


Use the sowing calendar for your area to see the best time to plant (see Appendix A). Do not plant all your seeds at once; rather plant regularly at two to three week intervals to produce a constant supply of vegetables throughout the year.

# How to sow seeds

## Introduction

- Seeds are delicate and require special care.
- Small seeds (ones that are very fine) such as cabbage, lettuce, tomatoes, green peppers, celery and onions should first be sown in seedbeds or containers like wooden boxes, pots, tins or old tyres. There they can grow into strong seedlings that can later be planted in the vegetable garden.
- Bigger seeds such as beans, peas and mealies can be sown directly in the vegetable garden.



## Sowing principles

- Sow seeds every two to four weeks to ensure an ongoing supply of vegetables.
- Use your sowing calendar to guide you as to when to sow different vegetable seeds.
- Grow seedlings in a sunny place that is protected from animals and strong wind.
- Sow seeds to the correct depth, twice as deep as the size of the seed. Do not sow the seeds too thickly.
- Because seeds are sown close to the surface of the soil, watering is very important, especially in the hot summer months. The soil in a seedbed must be kept moist at all times.
- You can use light mulch or netting (shade cloth) to protect the seedbed/containers from strong sun.
- Keep a record of when you plant seeds for production planning purposes.



# Planting directly in the trench bed

The seeds that can be planted directly in the trench bed are usually big seeds, for example beans, peas, pumpkins, squashes, melons and potatoes. You can also plant root vegetables, for example carrots, turnips and beetroot, directly in your trench bed.

## Sowing different vegetables

### Peas and beans



- Make the furrows 30cm apart and about 3cm deep.
- In each furrow, plant each pea or bean 10cm apart.
- Peas should be planted 1 to 2cm deep, while beans should be planted 2 to 3cm deep.
- Cover them with soil.
- Water gently and often.
- Soon you will see the tiny plants growing – these are called seedlings.
- When the seedlings are still small, they must be protected against birds. Cover them with a net of orange bags sewn together. Take the net off when the seedlings are about 15cm high.

### Maize



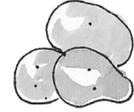
- Make the furrows 40cm apart and about 3cm deep.
- In each furrow, plant each mealie seed 40cm apart and 2 to 3cm deep.
- Cover them with soil.
- Water gently once a day to keep the soil moist.

### Squash, pumpkin and melons



- Dig small holes in the soil about 1m apart.
- Each hole should be about 10cm deep and 30cm wide.
- Mix two spades of compost with the soil from each hole, then fill the hole with the mixture. You will now have a slightly raised mound.
- Press four seeds into each mound, about 2cm deep and 10cm apart.
- When the seedlings are 10cm tall, pull out all plants except for the strongest one in each hole.
- Cover the soil with mulch.
- Water the soil often, because these plants need lots of water to grow well.
- Try to keep the leaves dry when watering the plants. This helps to prevent plant diseases.

## Potatoes



- Make the furrows 50cm apart and about 30cm deep.
- Put compost at the bottom of the furrows and then add a thin layer of soil.
- Plant the potato seeds one at a time, leaving 30cm between each seed.
- Cover with about 2cm of soil.
- You must water the young potato plants once a day, while the bigger plants need water once a week.
- When you see the potato plant poking out of the ground, cover the stem (not the tiny leaves) with more soil and compost. Allow it to grow, then cover it again. Repeat this two or three times. The more you cover the potato, the more roots the potato plant will make and the more potatoes you will have.

## Root vegetables



- Root vegetables can be planted directly in the trench garden.
- When the trench bed is ready, make small furrows or grooves in the soil using a stick. Make the furrows about 15cm apart and 2cm deep.
- Plant the seeds 1cm apart in each furrow and then cover them with about 1cm of soil.
- Water the seeds gently once or twice a day. You must keep the soil damp until you see the seedlings coming up through the soil. In summer, use a thin layer of mulch to prevent the soil from drying out, or cover with netting.
- After about four weeks you will need to thin the seedlings out to 2cm apart, so that the plants have enough space to grow. If the plants are too close together, they have to compete for food and water and become weak, unhealthy plants.
- You can replant the beetroot and turnip seedlings that you have thinned out, but carrots cannot be replanted. Their roots become broken or bent and you will get carrots with deformed shapes.
- Thin the seedlings out again after another two weeks. The spaces between plants should now be:
  - Carrots and turnips: 5cm or three fingers apart.
  - Beetroot: 7cm or four fingers apart.



# Growing seedlings in a seedbed or container

Small seeds need to be planted in a seed tray or seedbed until they make strong seedlings, and can then be planted (transplanted) in the trench bed. This includes plants like tomatoes, green peppers and eggplants.

## How to make a seedbed

- Choose a sunny place in your garden to make a seedbed. Ensure that it is protected from the wind.
- Make your seedbed 1m by 50cm. If you have lots of seeds to sow, you can make it larger (for example 1m by 1m).
- Dig to a depth of 30cm to loosen the soil.
- Dig one bucket of compost or old manure lightly into the soil and level the soil with a rake.
- Make furrows 10cm apart and 2cm deep.
- Sow the seeds very thinly in the furrow and cover them with soil. Try to space the seeds at least 1cm apart.
- Water gently every day to keep the soil moist. Do not let the seedbed dry out as the seeds will then die.
- Cover the soil with a net or thin layer of mulch to keep it wet.
- Remove the net or mulch when the seedlings appear. This should happen fifteen to eighteen days after sowing. The seeds will come up more quickly in summer.
- Birds like to eat small seedlings, so protect them with a net until they are bigger.

## Sowing in containers

- Most containers that are 5 to 10cm deep can be used to sow seeds in.
- They must have proper holes in the bottom to let excess water drain out.
- Make up a soil mix, using soil compost and sand. The mix must be light and crumbly and must drain well.
- The soil must be moist when you sow the seeds.
- Fill the containers, pushing the soil mix down gently.
- Level the surface with a small plank.
- Scatter the seeds very thinly, trying to space them 1cm apart. Cover the seeds very gently, and no more than half a centimetre deep.
- Water gently with a fine spray and place the container in a protected place.
- Keep the container moist until the seedlings are big.
- If the seedlings are too close together you can thin them out to 1 to 2cm apart. Do this once they have reached a height of 1cm.
- Another method is to plant the young seedlings into other containers spaced 2 to 3cm apart and to let them grow until they are 8 to 10cm tall before transplanting them in the vegetable garden.

## Transplanting seedlings

When the seedlings are about 8 to 10cm high, they can be transplanted. They should be that high six to eight weeks after sowing. In summer it is best to transplant seedlings in the early evening when it is cooler.

### How to transplant seedlings:

1. Water the seedbed and trench bed well before you transplant the seedlings to keep the roots wet.
2. Make a hole for each seedling in the trench bed.
3. Gently take the seedlings out of the seedbed, leaving some soil around the roots.
4. Hold the seedlings carefully by the leaves. Be careful not to damage or touch the roots.
5. Wrap the seedlings in damp newspaper before you move them from the seedbed to the trench bed, and do not expose the roots to the sun or wind.
6. Plant the seedlings with the roots hanging freely into the hole. The hole must be deeper than the roots. Do not let the roots bend up the side of the hole.
7. Press the soil gently around the seedlings with your fingers.
8. Immediately water the seedlings very gently.

Plant the seedlings the correct distance apart; otherwise they will not grow into strong, healthy plants. A good way to measure the distance between seedlings is to use sticks that you have to cut into different lengths. Use these sticks to mark out the required distance between the seedlings before transplanting. The distances are as follows:

- Onion: 15cm
- Spinach: 20cm
- Lettuce, green pepper: 30cm
- Broccoli, cabbage, cauliflower, eggplant: 40cm
- Tomato: 50cm

## Looking after the seedlings

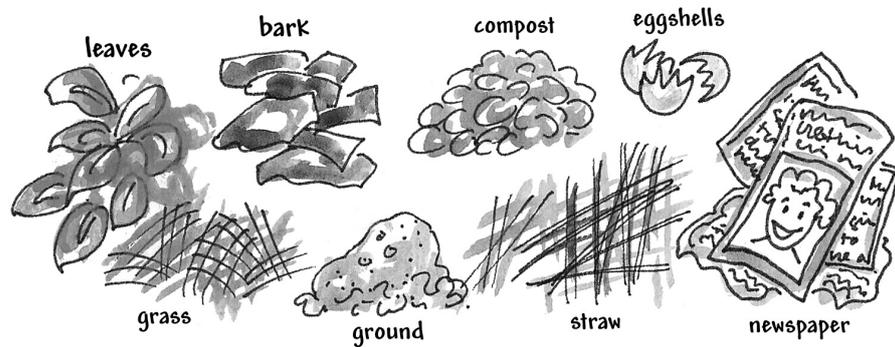
For the first two weeks after transplanting, the seedlings should be watered daily with a sprinkler or watering can. After two weeks, the seedlings need to be watered two or three times a week. Take care not to let them dry out. Spread mulch around each plant to keep the soil wet for longer.

In summer, protect the seedlings from the sun and the wind. Place a small branch with leaves next to each seedling to give it shade, or use a net made of orange bags sewed together to serve as a shade-roof. Remove the net after seven to ten days.

# Mulching ("Blanket for the soil")

Mulch can be made up of one or more of the following or more:

- Dry grass;
- dry leaves;
- straw;
- stones;
- compost; and
- wood chips.



These materials are spread in a layer of 5 to 10cm over bare soil and around plants, and covers the bare soil like a blanket.

## Why mulch your garden?

- Mulch helps to maintain good moisture and temperature levels in the soil, so less watering is required.
- Mulch helps to prevent soil erosion caused by wind and water.
- Mulch prevents weeds from growing.

Remember not to place mulch up against the stems of plants, because it will make them rot. Place a very light layer of mulch on seedlings and over soil after planting seeds – if the mulch is too heavy the seedlings will be damaged and the seeds will not grow.

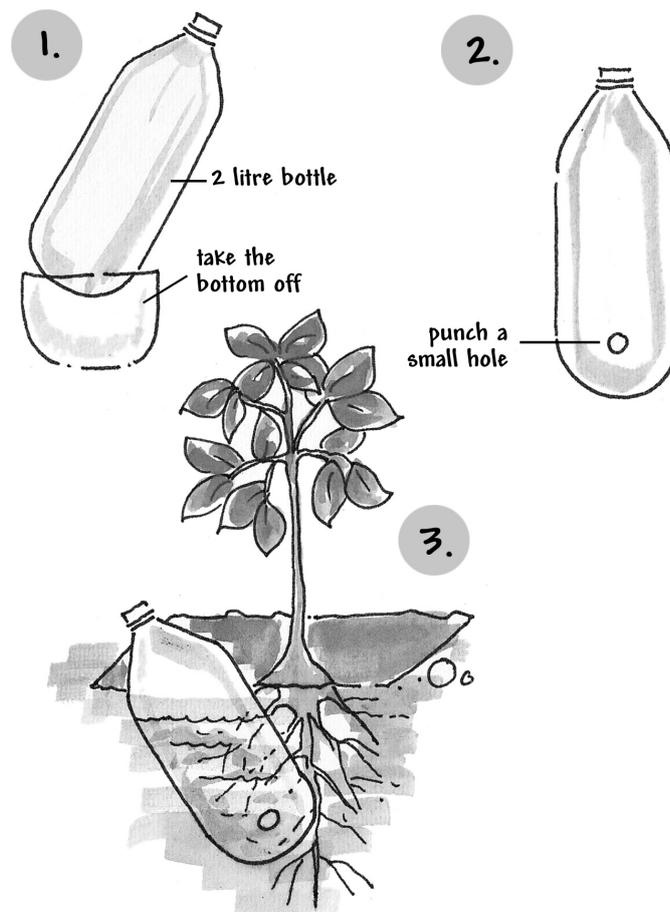


# Waterwise methods

Plants need adequate water to survive. The best time of the day to water your plants is in the late afternoon, so that the water does not evaporate fast. However, in areas that are prone to frost it is better to water the plants in the morning, otherwise the plants will be damaged by frost. Wash the frost from the leaves in the morning.

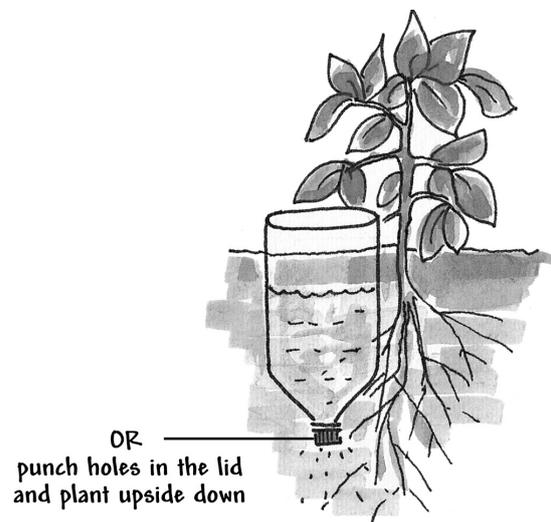
It is better to water your plants less often but with a good watering so that the water seeps down to below root level. If you water often, but do not water the soil deeply enough, the plant roots will only grow to shallow depth. If it becomes too hot, this can cause the roots to wither and die.

When watering newly planted seeds, only use a hosepipe that can make a fine spray. You can also use a tin with small holes or a watering can, so that the water is lightly sprayed over the seedlings.



You can also use a 2l plastic bottle to water your tree and save water. Punch a small hole at the bottom of the bottle and plant it in the soil next to the tree so that the water will seep out near the roots. Fill the bottle once a week and put the bottle top back on it to stop evaporation.

There is also another method that you can use. Take a plastic 2l Coke bottle. Cut off the base of the bottle, punch a few holes into the cap and then push the bottle into the soil cap first. Fill the bottle with water at its fat end, and it will slowly flow into the soil.



Remember what we learned about soil preparation:

- Compost helps to hold water moisture longer in the soil.
- Covering soil with mulch prevents evaporation and keeps the soil cool.

You can also use black plastic sheeting as mulching. Remember to cut out holes for your plants. The edges of the plastic should be lifted so that water will run into the holes where the plants are.

Grey water (water that has been used for washing or cleaning) can also be used in the garden. If you use grey water it should not contain chemicals that can harm plants, such as Jeyes Fluid or bleach. Normal green washing soap is fine and most brands of washing powder and dishwashing liquids can safely go into the garden as well. However, it is better to use grey water on trees than on vegetables that are intended for eating. Grey water should be filtered before using it on vegetables.

The best grey water to use is bath or shower water as this contains the smallest concentration of soap. It is better not to use the water from hand washed clothes because of the strong detergents.

Whenever possible, alternate grey water with fresh water as this will help to reduce the possible build-up of harmful salts and contaminants. Using organic material as mulch, also helps to decompose any harmful build-up of salts and other residues.

## Caring for your crops

It is important to take good care of growing crops to get the best results. Some important practises are:

- **Watering your vegetable beds well**

Water young plants daily, either early in the morning or in the late afternoon. If you use a sprinkler, each area should be watered for between 20 to 30 minutes. Bigger vegetable types can be watered less often, about two to three times per week, depending on the weather. Keep the beds covered with mulch to retain moisture.



- **Thinning and filling gaps**

Crops grown from seed are often sown too thickly, and need to be thinned out to the correct spacing. If your young plants die, fill the gaps with new plants as soon as possible.



- **Weeding**

Weeds compete with your vegetables for food and water. Keep your beds free of weeds by pulling them out.



- **Staking**

Certain plants, such as tomatoes and runner beans, need to be tied up as they grow tall.



- **Additional feeding**

Some crops might grow slowly or turn yellow. In that case apply compost or organic fertilizer by spreading it on the soil around the plants.

# Harvesting

Freshly picked vegetables are the most nutritious vegetables to eat. You must therefore only pick those vegetables that you can use or sell immediately. If you store vegetables, keep them in a cool place so that they stay fresh longer. You can keep vegetables cool by covering them with a wet hessian cloth.

Some vegetable plants produce more after you have harvested them, for example beans, peas and spinach. However, others, like carrots, do not regrow.

Use a sharp knife or cutters to remove leaves or vegetables from the main plant, for example spinach and peppers.

Remember your record keeping!

The following is a guideline for when you can harvest your vegetables:

• <b>Beans:</b>	Pick beans seven to ten weeks after planting, before they become hard and leathery. Pick twice a week. The more you pick, the more your plant will produce.
• <b>Beetroot:</b>	Pick eight to ten weeks after planting when the roots (bulbous vegetable) are 5cm across or bigger. Beetroot leaves can be eaten like spinach.
• <b>Broccoli:</b>	Pick eight to ten weeks after planting when the heads are firm and before the little yellow flowers appear.
• <b>Cabbage:</b>	Pick ten to twelve weeks after planting when the heads are firm, (20 to 30cm across) and before they start to split open.
• <b>Carrots:</b>	Harvest nine to twelve weeks after planting when the leaves are 15 to 20cm high.
• <b>Cauliflower:</b>	Pick ten to twelve weeks after planting when the heads are firm and measure 10 to 15cm. Break the outer leaves of the cauliflower and fold them over the cauliflower head to protect it from the sun.
• <b>Eggplants/ Brinjals:</b>	Pick twelve weeks after planting when firm and shiny, and 12 to 20cm in size.
• <b>Green peppers:</b>	Pick ten to twelve weeks after planting, when they are firm. The peppers should be 8 to 12cm long. Do not let them get soft.
• <b>Lettuce:</b>	Pick eight to ten weeks after planting, when the head is getting firm and before it starts to get brown or bursts.
• <b>Maize:</b>	Pick ten to twelve weeks after planting, when the cobs are full and the hairs on the end are brown and dry.
• <b>Onions:</b>	They take up to five months to be ready. Wait until the leaves are dry and brown. Then pull the onions out and dry them in the shade.
• <b>Peas:</b>	Pick peas ten to twelve weeks after planting when the pods are full and dark green. Do not wait until they get hard and leathery. Pick twice a week.



• <b>Potatoes:</b>	Lift three months after planting when the leaves and stems have dried. Dig out the potatoes carefully with a fork, so you do not damage the crop.
• <b>Pumpkin:</b>	Harvest eight to twelve weeks after planting.
• <b>Radish:</b>	Harvest five to seven weeks after planting.
• <b>Spinach:</b>	Pick from ten weeks on. Only cut two or three leaves at a time on the outside of the plant. The inside leaves will continue to grow. Feed your plants well so that you can keep picking them for up to nine months.
• <b>Squash:</b>	Harvest eight to twelve weeks after planting.
• <b>Tomatoes:</b>	Pick carefully eight to ten weeks after planting when they are almost red. Be careful not to break the branches. Leave a short green stem on the tomatoes, because that makes them stay fresh longer. Use a knife to cut the tomatoes off.
• <b>Turnips:</b>	Harvest seven to nine weeks after planting when the roots (bulbous vegetables) are 5cm across or bigger. Turnip leaves can be eaten like spinach.

## Nutrition

It is important to eat healthy food as it makes your body and mind healthy.

People who eat the right food have strong teeth and bones, good eyes, clear skin, clean blood and enough strength for the day's work. They do not become ill as easily as people who eat the wrong foods. People who suffer from illnesses such as Aids and TB are much stronger if they eat healthy food. Your food garden can help such people fight their illness.

The following table shows why it is important to eat fruit and vegetables.

Source	Why	Vitamins and minerals
Green leaf vegetables, e.g. turnip leaves and kale	It ensures strong, healthy teeth and bones.	Calcium
Legumes (e.g. peas and beans)	It plays a role in the formation of bones.	Copper
Soil, water, plants and animals	Helps with the maintenance of the bone structure and protects teeth enamel.	Fluorine
Spinach	It gives energy as it acts as a carrier of oxygen from the lungs to the rest of the body.	Iron
Vegetables grown next to the coastline are high in iodine.	Increase metabolism. Influences physical growth and mental development.	Iodine



<b>Source</b>	<b>Why</b>	<b>Vitamins and minerals</b>
Green leaf vegetables and dried beans, peas and nuts	Regulates nerve impulses and contraction of muscles. Magnesium is present in the skeleton.	Magnesium
Banana, potato, tomato, celery, carrots, oranges and grapefruit	Essential for the transferral of nerve impulses and contraction of muscles. Important element of all the cells in the body.	Potassium
Dark green leaf vegetables: spinach, turnip leaves, beetroot leaves Green stem vegetables: asparagus, broccoli Yellow vegetables: carrots, sweet potato, pumpkin, butternut Yellow fruit: apricots, peaches, melon	A shortage of vitamin A can lead to night blindness. Vitamin A is essential for the normal growth and development of teeth and bones, and contributes to healthy eyes and skin. Also helps the body to heal and to grow.	Vitamin A
Potato, sweet potato	Vitamin B lets the antibodies work together, and increases the glucose in the blood.	Vitamin B6
Raw, frozen and canned citrus fruit, e.g. oranges, grapefruit, lemons Fresh strawberries, melon, pineapple, guavas Vegetables: broccoli, brussels sprouts, spinach, green pepper, cabbage, turnip	Anti-oxidant A shortage can lead to retarded growth in a child or scurvy. Also improves general health and strengthens the immune system.	Vitamin C
Dark green leaf vegetables, nuts and legumes	Anti-oxidant Helps with circulation, building muscles and a strong heart, healing and general health.	Vitamin E
Legumes, peanuts	Essential for the immune system. Helps the body to heal and stay healthy.	Zinc



## Suggestions to the adult leader

The following are ideas to make your cubs/scouts excited about the project and to get them involved:

- Follow the progress of the garden by using a chart, such as this:

### Progress chart

Name	Trench bed been made?/ Container been prepared?	Seeds Sowed?	Is mulch being used?	Any vegetables harvested?

- Encourage the cubs/scouts to keep a record of when the vegetables were planted, etc. and ask them to report back at each cub/scout meeting on what they did in their garden the previous week.
- Make an experimental/example garden (this can be at an orphanage, school, church, etc.) and ask the children to help you with the garden. They can look after the garden during the week. This can be used as a good turn or service project, and will also promote scouting among other youth.



# Food for Life – Silver



## Introduction

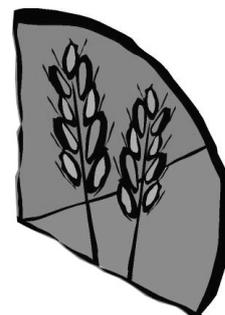
### Objective

By the completion of this stage the Scout will be able to provide nutritious vegetables for the family or community.

### Badge Requirement

To obtain the badge you should be able to do all of the following:

1. Completion of the Food for Life – Starter (Scout Programme) badge is a prerequisite for this badge.
2. Explain how crop rotation can ensure proper plant nourishment, minimise certain insect damage and provide sufficient vegetables all year round. Put crop rotation into practice by planting two different vegetables for two different seasons (these vegetables should be different from Food for Life – Starter or number 1 above).
3. Make and maintain a compost heap and use it for your second crop.
4. Explain how to care for your crops.
5. Name three insects or diseases that may attack your vegetables and explain how to get rid of them by using homemade/natural remedies.
6. Explain a method of collecting rainwater.
7. Explain permaculture.
8. Explain a balanced diet.
9. Demonstrate the correct methods of cleaning and cooking vegetables.



### Suggestions for the Adult Leader

- Organise a competition for the best garden or biggest vegetable in your troop or district.
- Make a compost heap at your meeting place.
- Keep a progress chart as in Food for Life – Starter.



# Soil nutrition (the organic way)

To create healthy, living soil in our garden we need to do the following:

- **Make compost heaps:** collect plant materials and manure and mix them into heaps (see compost making). This is one of the best ways of making plant food to feed the soil. You can also make compost using an earthworm farm.
- **Make trench beds:** when you prepare a trench bed, you are in fact making a compost heap in your trench and then covering it with soil. This allows for you to plant your bed immediately, as you do not have to wait for the materials to decompose.
- **Use animal manure:** manure is plant material that has been digested by animals. It is best to use older, matured manure, because fresh manure can burn plants. Old manure can be spread over a bed and dug into the soil.
- **Mulch your garden beds:** soil can be covered with a layer of materials like leaves and straw. This helps to create a better environment for soil organisms by maintaining moisture and temperature levels.
- **Green manure crops:** plants in the bean family (like beans, peas, lucern and lupines) are good in this regard. Let them grow till they make flowers, and then dig them into the soil.
- **Natural fertilizers:** use, for example, bone meal and wood ash.
- **Liquid manure teas:** These can be made from animal manure and certain herbal plants (see liquid manure).

## How to make compost

Compost making is one of the best ways to recycle organic waste materials into food for your soil and plants.

### Why make compost?

- It is easy and cheap to make.
- It is the best way to improve the soil structure.
- It provides soil with a balanced meal.
- It adds micro-organisms that help fight soil diseases.

# Making a compost heap

## What will you need?

Any material that can rot easily, for example green and dry plant material, vegetable peels, leaves, comfrey leaves, weeds, grass, straw, bones, manure and wood ash (in small quantities).

## What not to use

Plastic bottles, tins, glossy paper, diseased plants and fruit, kikuyu and kweek grass roots and woody material. Do not use left over meat, because meat attracts dogs and causes diseases. Do not put rotten fruit in as it breeds flies and other insects.

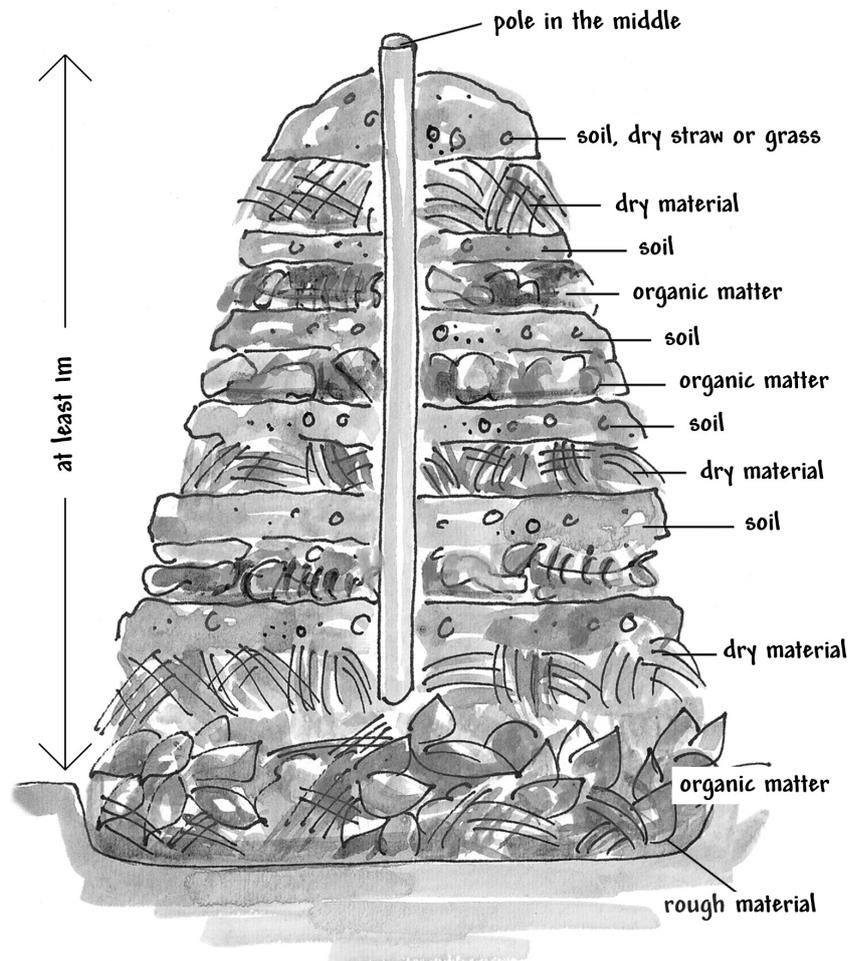
## Where to make your heap

Near to your garden and preferably in a shady place that is also protected from the wind.

## How to make a compost heap

Compost is made by putting one kind of waste material on top of another, in layers:

1. Start by loosening the soil where the heap will be located, using a fork or spade.
2. Then put down a 20cm layer of coarse/rough material, such as twigs, as a base for the heap. This later helps to let air into the heap, and allows excess water to drain from it.
3. Next add a layer of wet green material, 15 to 20cm thick (like kitchen waste, grass clippings and leaves).
4. Add a layer of dry material 10 to 15cm thick (like dried leaves and plants, grass and straw).
5. Next add a 5cm layer of manure, compost or topsoil – this helps to activate the decomposition process.
6. Water each layer as you build the heap.
7. Repeat the above steps as you build the heap up to a height of 1,5m or more.
8. Finally cover the heap with a layer of dried straw, grass or soil.



## Do's and don'ts of compost making

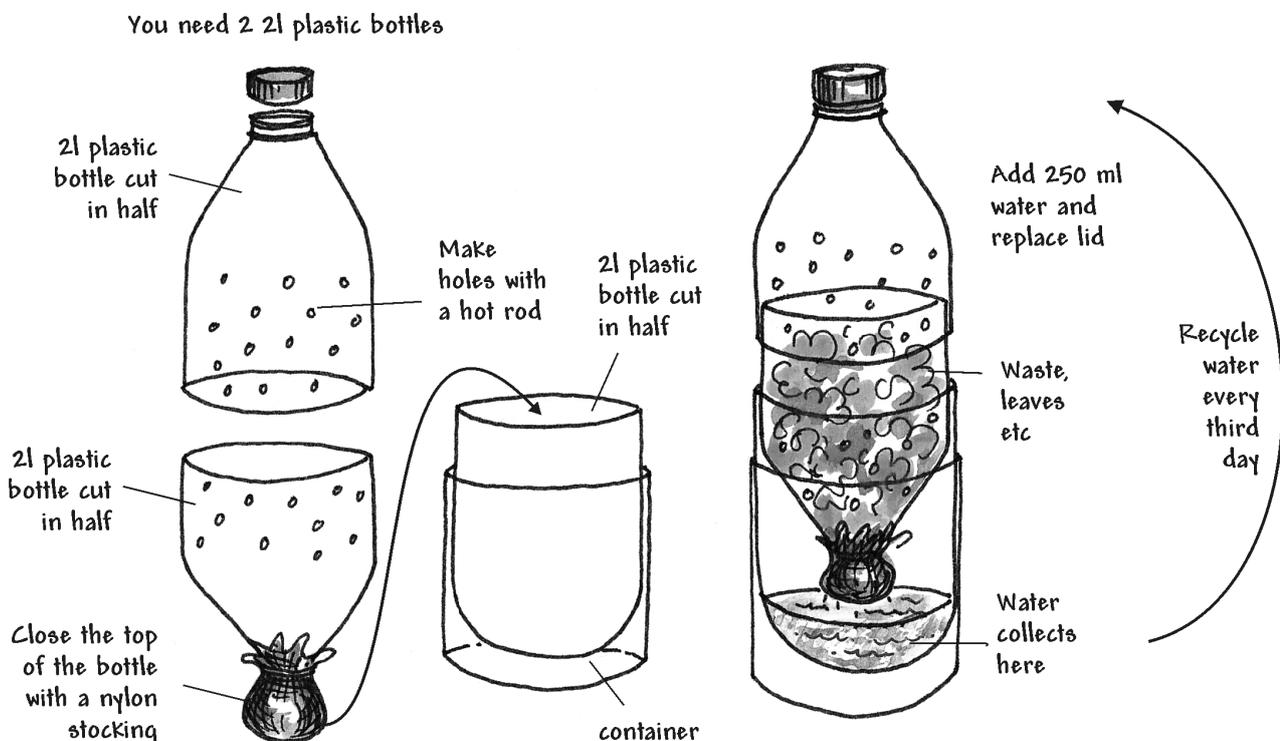
- Keep the heap damp, but do not make it too wet. The material should feel about as damp to the touch as a squeezed-out sponge.
- Try to mix waste material to get a good balance of wet (green) and dry types.
- Do not put on thick layers of grass cuttings or leaves as they form a barrier that prevents water and air from reaching the rest of the heap.
- Large, coarse material such as cabbage and mealie stalks should be chopped up or shredded before being added to the heap.
- You can turn your heap every three to four weeks to speed up the decomposition process, and add small amounts of chicken manure. Also add water if it is dry.

## When to use the compost

Use the compost once all the materials have decomposed, forming a brown crumbly material. This usually takes between three to six months.

## Suggestions to the Adult Leader

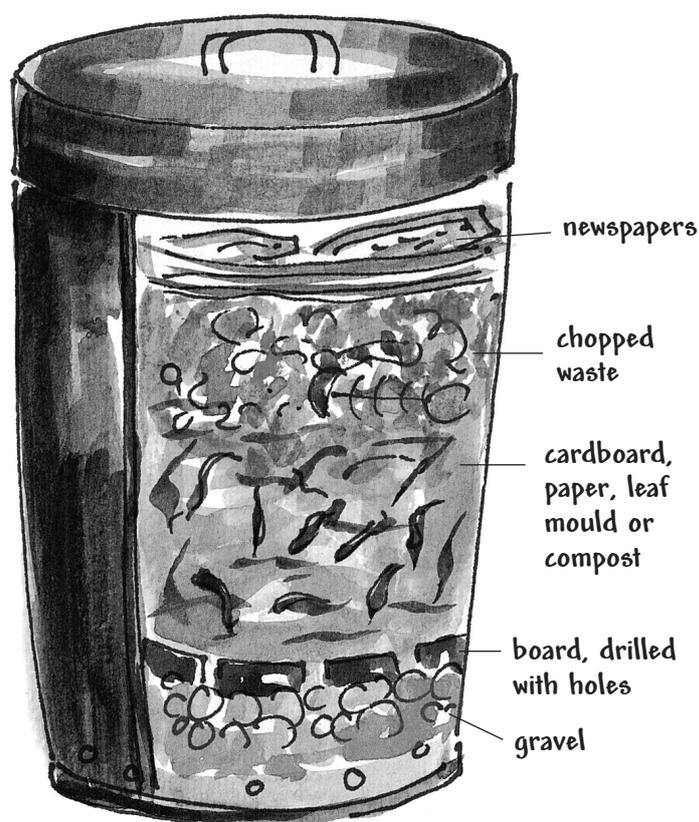
Consider making the compost column as explained below and taking it with you when you discuss this issue within your troop.



## Making an earthworm farm

Earthworms are very good for aerating the soil, thus increasing the movement of nutrients. Worm farming is an easy way to turn organic waste into high quality compost called “earthworm castings”, without mess, fuss or smell. Worms eat their own mass in organic matter and minerals daily. To increase the population of earthworms, you can build an earthworm farm using an old dustbin.

- Drill a few holes near the bottom of the bin to allow liquids to escape. Raising the bin on bricks is a good idea. Choose a very shady place for the bin.
- Put a layer of gravel in the bottom of the bin.
- Place a board, drilled with a few small drainage holes, on top of the gravel.
- Start the worms off in a moist bedding, consisting of shredded cardboard or paper, leaf mould or compost.
- Add a little chopped waste and cover it with newspapers to retain the moisture.
- Replace the dustbin lid. (Cut the lid so that it can go up and down in the bin depending on how much material you have in it.)
- You can start with worms that you have found in the garden, or order worms from a commercial supplier.
- All you need to do now is to keep adding kitchen waste and to ensure that the contents of the bin stay moist, but not sopping wet.
- You will soon work out how much food to give the worms and how often. The worms will control their population according to the amount of food available to them.
- When you want to “harvest” castings, simply leave the lid off the bin for an hour (make sure it is not in the heat of the day or that the bin is not in the sun) and then remove the top layer. The worms will have dug down to a safe depth to escape from the light.
- Remember to replace the lid.



If your worm farm starts to smell it could be because:

- There is too much waste for the worms to manage – cut down on the waste you are adding.
- The temperature too hot or cold – move the bin.
- The content is too wet – drain off liquid.
- The content is too acidic – do not add citrus (e.g. oranges and lemons).



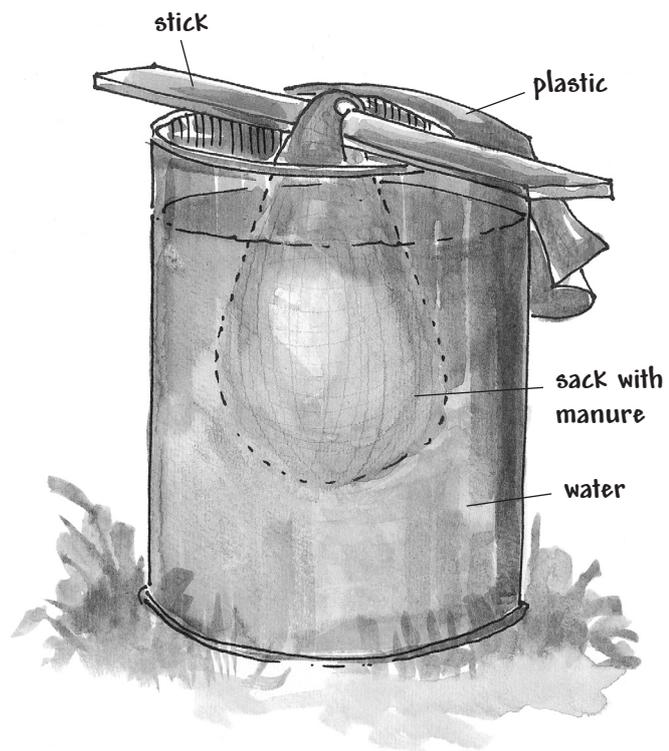
## Preparing liquid manure

Liquid manure (also called tea manure) is a cheap way to feed plants and the soil. It is easy to make and use. Remember the following when making liquid manure:

- It is best to use chicken manure.
- It will make a big difference to the growth of your plants, as the nutrients are quickly available to the plants.
- It can also be made from certain herb plants such as comfrey and stinging nettle, as well as seaweed.

### How to make liquid manure:

- Place two bucketfuls of manure or fresh herb plants in a woven sack and tie the neck securely.
- Suspend the sack from a stick into a 200 litre drum filled with water.
- Cover the drum with a lid or plastic.
- Move the stick up and down and stir the water every three days. There will only be a strong smell when using manure.
- The mixture is ready to use when the water is brown (after about three to four weeks).
- Mix one litre of liquid manure with six litres of water. The resulting product should be the same colour as weak tea.
- Using a watering can or bucket, gently pour it on the ground around plants. Do not pour it on the leaves, because they may burn.



### How to use liquid manure:

- Use it to feed young plants (seedlings) during their first four to six weeks of growth.
- Feed your plants once a week, early in the morning before the sun heats up.
- Chicken manure is best for leaf and fruit crops.
- Comfrey tea is good for root crops as well as flowering and fruiting crops.
- Seaweed is very good for seedlings and all plants.

# Crop Rotation

Vegetables are divided into three groups:

- root vegetables;
- the bean family; and
- leaf and fruit vegetables.

Each season you should grow vegetables from a different group in the same row or bed. This is called crop rotation.

## Why rotate crops?

- To keep the soil healthy

Do not plant the same kind of vegetable in the same row or bed every season. Each kind of vegetable needs a different amount of food from the soil. If the same kind of vegetable is planted every season, the soil can become very poor and nothing will grow well.

- To prevent diseases

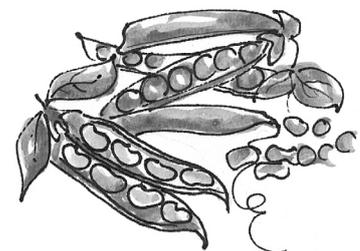
Your vegetable may have a disease. If you plant the same kind of vegetable in the same place again, the new crop will also become sick. However, a different kind of vegetable will not easily catch that disease.

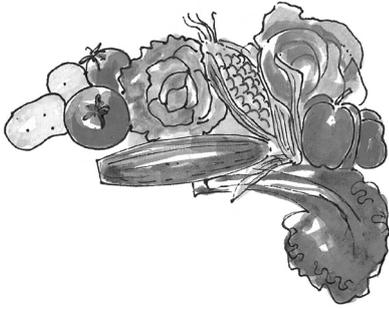
## Which crops to rotate



**Root vegetables** include carrots, turnips and beetroot. Root crops grow well even with a small amount of compost or old manure, and are therefore called light feeders.

The **bean family** includes peas, beans and lucerne. To grow well these vegetables need more food (a medium amount of compost or old manure) than root crops, and they are therefore called medium feeders. When these vegetables are fully-grown their roots enrich the soil, and they then give more food back to the soil than they have removed from it.





**Leaf and fruit vegetables** include tomatoes, cucumbers, potatoes, maize, green peppers, spinach, cabbage and lettuce. They need a lot of compost and manure to grow well, and are therefore called heavy feeders.

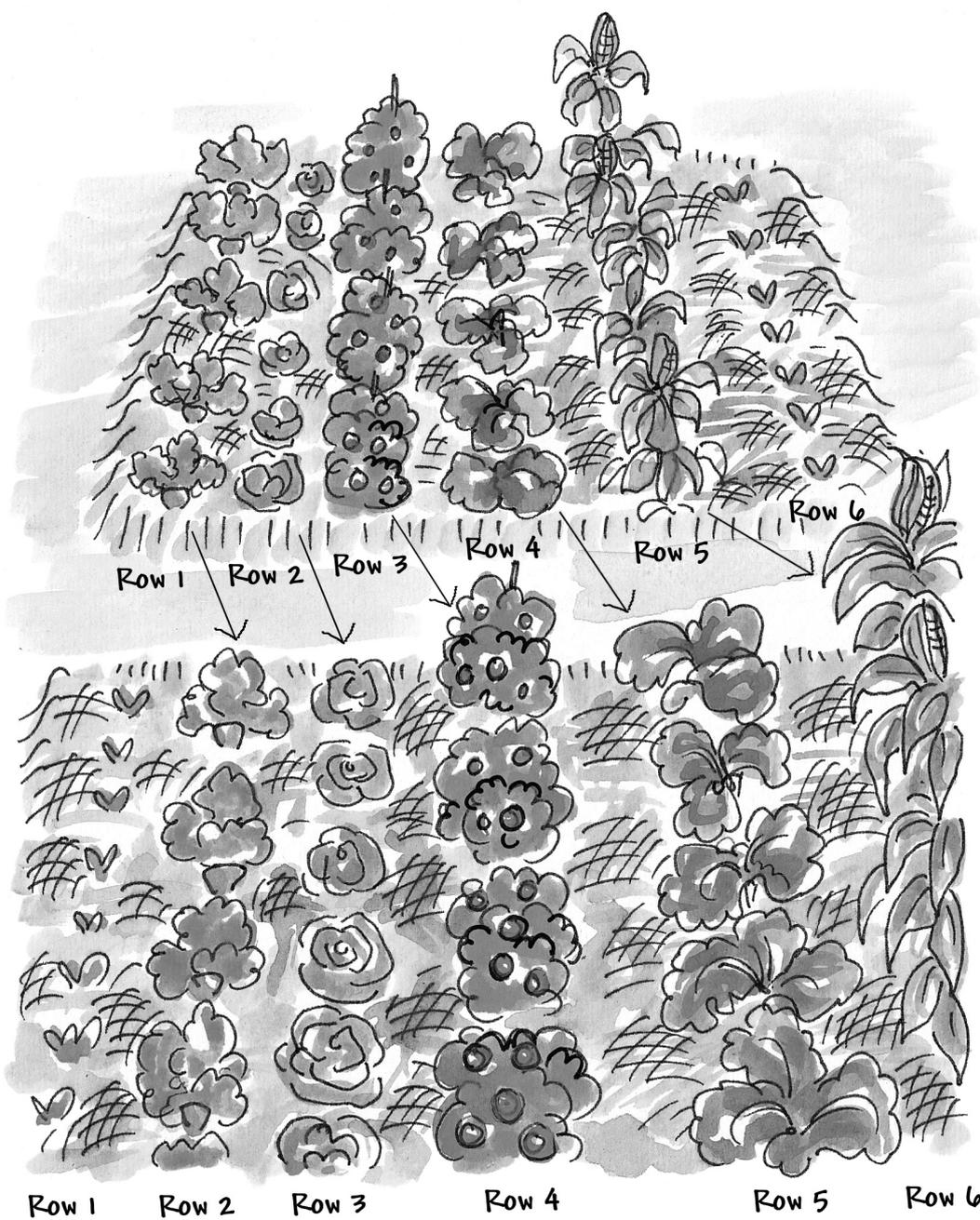
Grow a different type of vegetable in every row of your trench bed each season. The first season, plant root vegetables in a row, the next season plant vegetables from the bean family there, and the following season leaf and fruit vegetables. Then repeat the cycle. This will help to keep your vegetables healthy and free of diseases.

Here is a typical four year planting plan for a trench bed garden:

	1 <sup>st</sup> year	2 <sup>nd</sup> year	3 <sup>rd</sup> year	4 <sup>th</sup> year
Row 1	Peas, beans, celery, leeks	Carrots, parsnips, beetroot	Cabbage, cauliflower, Brussels sprouts, onions, lettuce, turnips	Potatoes
Row 2	Carrots, parsnips, beetroot	Cabbage, cauliflower, Brussels sprouts, onions, lettuce, turnips	Potatoes	Peas, beans, celery, leeks
Row 3	Cabbage, cauliflower, Brussels sprouts, onions, lettuce, turnips	Potatoes	Peas, beans, celery, leeks	Carrots, parsnips, beetroot
Row 4	Potatoes	Peas, beans, celery, leeks	Carrots, parsnips, beetroot	Cabbage, cauliflower, Brussels sprouts, onions, lettuce, turnips

Of course this will require good records of where you planted your last crop!





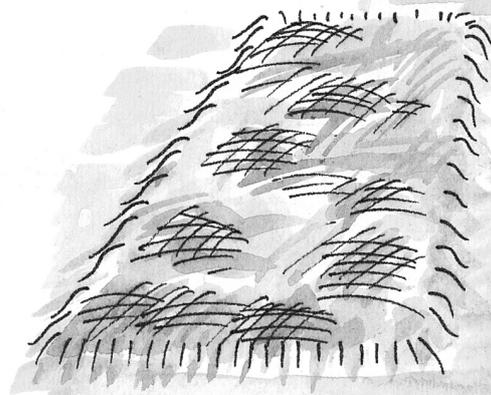
If you have four beds and you only plant one type of vegetable per plot, you will rotate your planting in the same way as explained above, only substituting beds for rows.



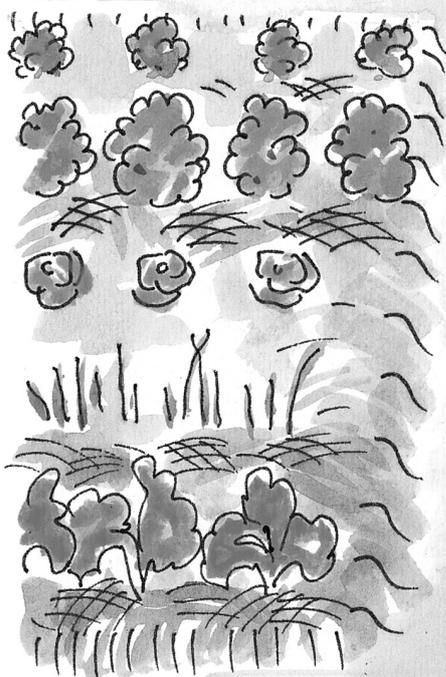
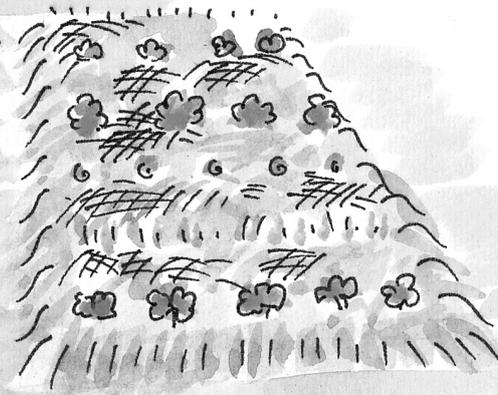
# Succession planting

If you have enough space for more than one bed, you will be able to plant in succession. This must not be confused with crop rotation. Succession planting (ongoing planting and harvesting) is where one bed is planted, the second one three to four weeks later, and the third bed three to four weeks after the second one. This results in a continuous supply of a variety of fresh vegetables throughout the year. Thus, to be able to always harvest some vegetables from your garden, you need to plant seeds and seedlings every three to four weeks during the correct months of the planting season.

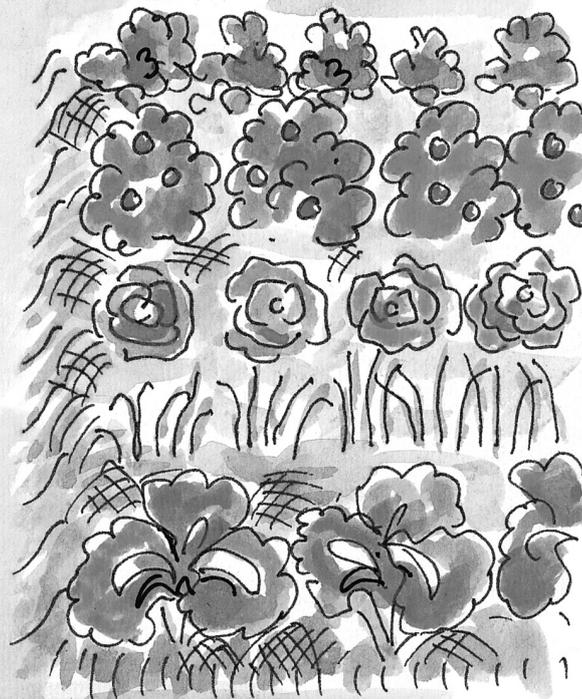
**Bed 4:** Seedlings being nursed



**Bed 3:** Young vegetables growing



**Bed 2:** Almost ready to harvest



**Bed 1:** Harvesting and eating these vegetables; almost empty

# Caring for your crops

It is important to take good care of growing crops to get the best results. Some important practises are:

- **Water your vegetable beds well**

Water young plants daily, either early in the morning or in the late afternoon. If you use a sprinkler, each area should be watered between 20 to 30 minutes. Bigger crops can be watered less often, about two to three times per week, depending on the weather. Keep the beds covered with mulch to retain moisture



- **Thinning and filling gaps**

Crops grown from seed are often sown too thickly, and need to be thinned out to the correct spacing. If your young plants die, fill the gaps as soon as possible.

- **Weeding**

Weeds compete with your vegetables for food and water. Keep your beds free of weeds. Mulching discourages weed growth.



- **Staking**

Certain plants, such as tomatoes and runner beans, need to be tied to a stake as they grow tall.

- **Additional feeding**

Some crops might grow slowly or turn yellow. In that case apply compost or organic fertilizer. You should spread it on the bed around the plants.

- **Give some vegetables special care**

Let us look at some problems you might have with particular vegetables, and some suggestions of how to care for them.



<b>Vegetable</b>	<b>Problem</b>	<b>Care</b>
Carrots	The roots are too small.	They need to be thinned out twice (to 5cm apart). If they are not growing well, give them more compost within the first eight weeks.
Onions	In certain areas some types of onion only grow well in the cold and warm months and  and other types only grow well in both seasons.	Choose the right type of onion for the season: Texas Grano in warm season and Caledon Globe in cold season.
Peas and beans	Birds love to eat these plants.	When the plants are small, use a net to protect them. Take the net off when the plants are about 15cm high. Push sticks into the soil between peas and runner beans for the plants to climb up.
Spinach, lettuce and cabbage	The leaves look small and yellow.	Dig some manure lightly into the soil around each plant (not dog manure) or feed with liquid manure.
Tomatoes	When the plants are about 15cm high, they begin to fall over.	Push tall sticks into the ground next to the plants and tie the tomato plants loosely to the sticks. When they grow bigger, tie the plant again. Remove most of the side branches as the tomato plants grow. For big tomatoes: leave one main stem with a few strong and healthy branches.



# Insects and diseases

Many gardeners wonder how they can stop insects from eating their vegetables and prevent their plants from getting diseases.

You can control pests and diseases either with chemical poisons or by natural (organic) means. Chemical poisons are very dangerous: they not only kill harmful pests, but also helpful insects, thus creating an imbalance in nature's way of controlling pests. They can also make people very ill and can even lead to death. Chemical poisons are also expensive and pollute the environment.

## Helpful insects and other small animals (also called beneficial insects or predators)

Not all insects are harmful. The following are beneficial:



**Chameleons:** eat bad insects and pests



**Ladybirds:** they feed on aphids as well as scale insects, maize bugs and Australian bugs.



**Frogs:** eat bad insects and pests



**Spiders:** all spiders eat insects and in doing so help to keep down populations of insect pests.



**Earthworms:** help to make compost and put air into the soil



**Hover flies:** yellow and black flying insects that lay their eggs amongst colonies of aphids. When their eggs hatch, the larvae feed on the aphids.



**Praying mantis:** they eat a wide variety of harmful pests, including aphids and grasshoppers.



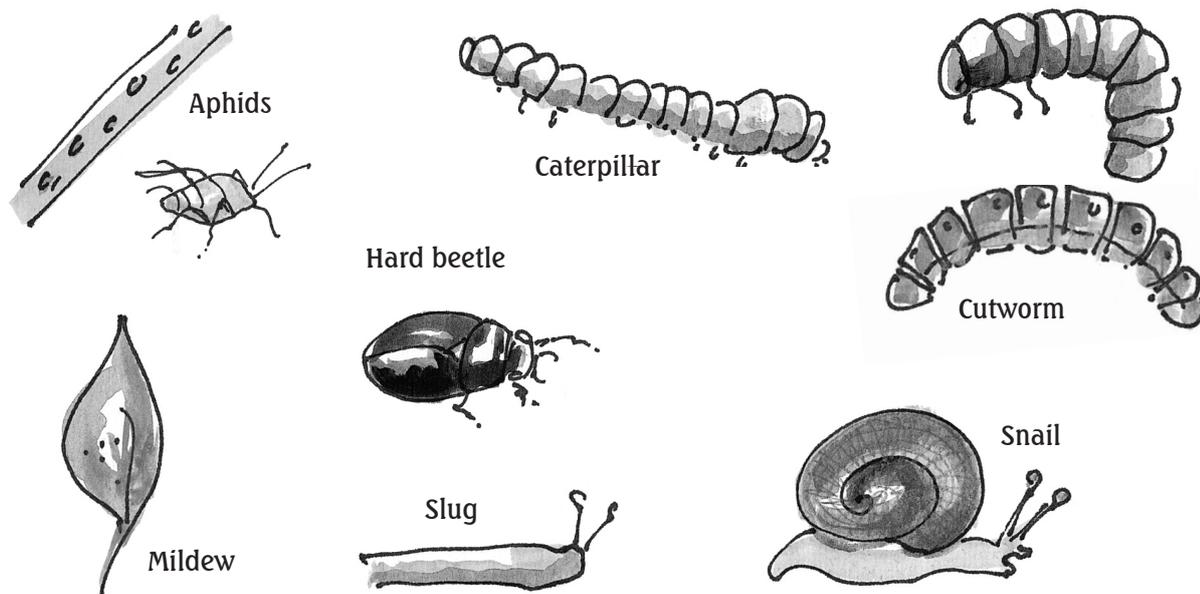
**Wasps:** the adult wasp paralyzes various types of larger insects, including beetles and caterpillars, leaving them next to its nest as food for their young.

**Lacewings:** mainly green and brown in colour. They eat aphids and the larvae of maize bugs.

Other beneficial insects include beetles, robber flies, dragonflies, assassin bugs, ant lions, various ground beetles and flies.



## Bad (harmful) insects and creatures



## Combating pests

We will now look at natural ways to prevent and control insects and plant diseases.

### Preventative methods

- **Mixed gardens** (diversity in the garden): it is good to plant different kinds of vegetables, flowers and herbs in your garden. Herbs and other strong-smelling plants (like onions and garlic) can distract or confuse insects. It will attract bees and butterflies and repel pests. You can even make onion and garlic sprays. Other plants, like flowers and herbs, attract helpful insects and animals.
- **Good soil practice:** healthy soil full of compost and micro organisms produce healthy plants. Healthy plants are more resistant to attack by pests and diseases.
- **Crop rotation:** if you grow the same crop in the same bed/row every season, there will be more pests and diseases than if you rotate the crops. It is best not to grow potatoes and tomatoes in the same bed at shorter intervals than four years.
- **Time of planting:** different pests and diseases attack crops at different times. Insect pests breed most in the hottest weather. If you plant early in the season you will avoid the worst time for insects.
- **Hygiene in the garden:** it helps to keep the garden clean. Clear materials from beds after harvesting and use it in the compost heap or trench bed. Remove and burn all diseased plants.
- **Watering:** poor watering practices will result in weak plants that will be easier to attack. Some plants, such as tomatoes, onions and squashes, get fungal diseases easily. You can water such plants with a sprinkler when they are young, but as they grow bigger they must be watered at the base, to prevent the leaves from getting wet. It is best to water these plants in the morning.
- **Healthy seeds:** be sure to collect seeds from healthy plants. Seeds collected from diseased and weak plants will produce weak crops. Plant the correct varieties that are suited to your area.

## Control methods

Control methods refer to spraying your plants with insecticides made from natural sources. You can make most of these yourself and they cost very little. Below are some recipes for such insecticides.

### Garlic and paraffin spray

*You will need:*

- 3 garlic cloves
- 2 teaspoons liquid paraffin
- ½ litre cold water
- 1 tablespoon dishwashing liquid

*Method:*

- Chop three garlic cloves very finely.
- Soak the chopped cloves in two teaspoons of liquid paraffin for two days.
- Add half a litre of cold water and shake well.
- Add one tablespoon of dishwashing liquid.
- Put the mixture into a bottle and let it stand for one day before using it.

*How to use the spray:*

- Mix five tablespoons with one watering can of water.
- Spray plants that have insects on them.
- Repeat one week later.

Store out of reach of children. The spray can make you sick if you drink it.



## Other ideas:

- Collect small leftover pieces of household soap in a jar, and add a little water. Dilute the soapy water and use as a spray to combat aphids on the leaves of fruit trees. As ants feed on aphids, you can also attack the source of the problem – the ants. You can do this by painting the base of a fruit tree, to a height of about 60cm, with a strong solution of soft soap.
- Boil half a cup of pipe tobacco in 2,5 litres of water for 30 minutes, strain out the tobacco and add 1 tablespoon of chopped or liquid soap (take care, as tobacco juice is poisonous). Apply with a watering can or spray over the plants.
- Mix 20 litres water, 10 ml bicarbonate of soda, 20 ml carbolic acid, one cup well-boiled tobacco liquid and one bar finely grated soap.
- Tomato leaves are effective against aphids, grasshoppers, flies and caterpillars. Crush the leaves, and soak them in water to make a strong solution. Spray this solution on affected plants, using an ordinary household fly-spray. Rain will wash the solution off the plants, so spray again after a rain shower.
- Soak onions, chopped and crushed, in an equal quantity of water. Strain the mixture, and use as a spray against red spider and aphids. Onions are expensive to buy, but you can grow your own.
- Dry cayenne pepper, sprinkled over plants wet with dew or rain, repels caterpillars. A cayenne pepper solution can also be sprayed over plants.
- Skimmed milk has been found to be effective against the mosaic virus when sprayed on tomato, green pepper or chilli plants.
- The attractive garden plant, the Marigold, can be used to make a “tea” that is effective against aphids and weevil eggs. Place a few handfuls of leaves (green or dried) in a container, pour boiling water over the leaves and let it stand overnight. Then strain it, and spray on the affected plants.
- For healthy potatoes, and soil free from nematodes (eelworms), plant a few Marigolds among the potatoes. They will discourage nematodes, and you can use the leaves later as described above.
- Ordinary household salt can be used to deal with snails and slugs. Just sprinkle a little salt on them, or spray them with a salt solution.
- Plastic Coke bottles, yoghurt cups or milk bottles are useful for defending young plants, such as cabbage, cauliflower, lettuce and other, against cutworm. Cut off the top and bottom of the bottle or cup. Then cut the rest of it (depending on its size) to make two or three “collars”. Place a collar carefully around each young plant, and push the base of the collar gently but firmly into the soil. This “fence” around the young plant not only prevents the cutworm from chopping the plant off at the base, but also helps protect the plant from the hot sun and wind.



## Specific pests can be fought in the following way:

<p><b>Snails and slugs</b> – like to hide and breed under leaves.</p> <ul style="list-style-type: none"> <li>• Place wooden planks</li> </ul>	<p>around your garden in the evening. The snails will crawl under the planks during the night, and you can then catch them the next morning and kill them.</p> <ul style="list-style-type: none"> <li>• Place snails and slugs in a tin of salty water. They will die very quickly.</li> <li>• Spread crushed eggshells or wood shavings in the beds around your plants or around the entire garden to prevent snails from getting to the plants. Snails and slugs do not like crawling over eggshells or wood shavings because of the sharp edges.</li> <li>• Another way to get rid of snails is to keep ducks and bantams. Be careful though: because ducks and bantams love to eat seedlings, you will need to protect them. However, if the ducks and bantams are well fed, they will not eat your plants, only the snails and slugs. Snails and slugs are a delicacy they cannot resist!</li> </ul>
<p><b>Aphids</b> – very small grey, white or green insects.</p>	<ul style="list-style-type: none"> <li>• You can get rid of aphids by rubbing them off plants with your fingers, spraying them with a strong jet of water from the hosepipe, or by using a paraffin and garlic spray. Spray the plants again after one week.</li> <li>• Plant nasturtiums, onions and garlic between your plants as their strong smell will chase away aphids.</li> <li>• Ladybirds eat aphids.</li> <li>• Plant stinging nettle close to your vegetables.</li> </ul>
<p><b>Cutworm</b> – light grey or brown worms that eat the stems of young plant at night.</p>	<ul style="list-style-type: none"> <li>• One week before planting, dig ash or tobacco dust into the soil. This will kill cutworms. Remember that tobacco dust is very poisonous.</li> <li>• Put a “collar” of cardboard or plastic around each plant to stop the cutworms from eating them.</li> <li>• In the morning, dig up cutworms in the soil around cut-off plants and kill them. It is very important to get rid of these pests.</li> <li>• Finely crushed eggshells spread around small seedlings may help to keep the cutworms away.</li> </ul>
<p><b>Moles</b></p>	<ul style="list-style-type: none"> <li>• Pour water into the mole holes in your garden or set traps.</li> <li>• Moles hate strong smells. Pour Jeyes Fluid into their holes or anything else that has a strong smell (like urine).</li> <li>• Put cigarette ends down the holes. The bad smell sometimes chases moles away.</li> <li>• Plant onions all around your garden, because moles do not like the smell of onions. This works very well!</li> </ul>

<p><b>Mildew</b> – a white powder on the leaves of vegetables.</p>	<ul style="list-style-type: none"> <li>• Too much water on the plants' leaves causes mildew. You can avoid mildew by watering only the ground around your plants, and keeping the leaves dry.</li> <li>• Collect all infected leaves, flowers and stems and burn them.</li> </ul>
<p><b>Cabbage moths</b></p>	<ul style="list-style-type: none"> <li>• Spread chopped tomato leaves in and around the cabbages to deter them.</li> <li>• Mix one teaspoon of salt into two litres of water, and spray the solution on the plants.</li> </ul>
<p><b>Fruit fly</b></p>	<ul style="list-style-type: none"> <li>• The simple trap illustrated below, and the removal of fallen fruit, can go a long way towards eliminating fruit fly. The trap is regularly baited with orange or cucumber pulp, 100ml ammonia (or urine) and 500ml water. If the trap is not regularly cleared of the dead flies, other flies will avoid it.</li> </ul> 
<p><b>Nematodes</b> – also known as eelworms, are microscopic (less than one mm in length) worm-like creatures, that eat roots and so cause the root system to fail.</p>	<ul style="list-style-type: none"> <li>• Compost regularly: nematodes are found in soil that is poor in organic matter.</li> <li>• Plant nematode-resistant vegetables, e.g. onions, lettuce and members of the cabbage family.</li> <li>• Alternate between vegetable varieties that are nematode sensitive, e.g. tomatoes, potatoes, beans and carrots, and varieties that are not.</li> <li>• Plant Marigolds as they help to eliminate nematodes.</li> </ul>

<b><i>Ants and termites</i></b>	<ul style="list-style-type: none"> <li>• Crush dried chillies into a fine powder and sprinkle it where the ants are running.</li> <li>• Plant spearmint, tansy or penny royal close to the vegetables.</li> </ul>
<b><i>Hard beetles and grasshoppers</i></b>	<ul style="list-style-type: none"> <li>• Collect them by hand and burn them. Spread the ashes around the plants.</li> </ul>
<b><i>Cabbageworm</i></b>	<ul style="list-style-type: none"> <li>• Spread chopped sage, mint or tomato leaves around the vegetables.</li> </ul>
<b><i>Flies</i></b>	<ul style="list-style-type: none"> <li>• Plant rue, tansy or tomato.</li> </ul>
<b><i>Mosquito</i></b>	<ul style="list-style-type: none"> <li>• Plant legumes.</li> </ul>
<b><i>Moths</i></b>	<ul style="list-style-type: none"> <li>• Plant sage, lavender, mint or stinging nettle.</li> </ul>

See Appendix B for possible problems with specific vegetables.

# Companion planting

Many types of vegetables complement each other, which means that a vegetable enjoys growing near a certain herb or another type of vegetable. Utilising this when planting is referred to as “companion planting”. The following is a table of companion plants:

<b>Vegetable</b>	<b>Likes</b>	<b>Dislikes</b>
Bush beans	Most vegetables, especially beetroots, carrots, celery, potatoes, radishes, strawberries, corn and leeks	
Climbing beans	Maize and carrots	Onions, the cabbage family and sunflowers
Cabbage family, broccoli, kale, strawberries, kohlrabi, Brussels sprouts and cauliflower	Beetroots, celery, lettuce, onions, potatoes, tomatoes and bush beans	Climbing beans
Celery	Bush beans, cabbage family, leeks, tomatoes and cauliflower	
Cucumbers	Bush beans, cabbage family, maize, lettuce, radishes and sunflowers	Potatoes
Leeks	Beetroots, bush beans, carrots, celery and onions	
Lettuce	Carrots, radishes, onions, spinach and strawberries	
Maize	All bean varieties, beetroots, pumpkin and squash family and potatoes	
Onions	Beetroots, cabbage family, carrots, lettuce and leeks	
Peas	Carrots, radishes, spinach and turnips	Potatoes and beans
Potatoes and sunflowers	Bush beans, cabbage family, maize and peas	Tomatoes, cucumbers, pumpkins and squashes
Radishes	Interplant with most vegetables; fast-growing	



<b>Vegetable</b>	<b>Likes</b>	<b>Dislikes</b>
Soya beans	Interplant with most vegetables, especially mealies	
Squashes and pumpkin family	Maize and radishes	Potatoes
Sunflowers	Pumpkins and squashes	Climbing beans and potatoes
Tomatoes	Asparagus, celery, onions and cabbage family	Apricot trees and potatoes

Herbs make good companions for food plants. You may not know all of them, but try them. If you plant herbs between vegetables, it can benefit the crop in different ways:

<b>Herb</b>	<b>Vegetable and fruit companion</b>
Basil	Attracts pollinating insects to cucumbers, prevents fungal diseases on baby marrow and improves the taste of tomatoes, lettuce and parsley.
Borage	Plant with tomatoes, squash and strawberries.
Calendula	Keep pests away. Plant with tomatoes, and all over the garden.
Caraway	Improves the taste of potatoes and cabbage.
Coriander	Plant around the garden to repel pests.
Dill	Improves the seed germination of cucumbers, cabbage and beetroot.
Garlic	The smell protects strawberries, cucumbers, carrots, lettuce and tomatoes from fungal diseases and deters mice.
Oregano	Deters insects from broccoli plants.
Parsley	Acts as a snail deterrent for onions and radishes and improves celery, leeks, peas and tomatoes.
Peppermint	Plant with cabbage.
Rosemary	Plant with beans, cabbage and carrots.
Sage	Plant with cabbage and carrots.
Tansy	Plant around the garden to repel ants.
Yarrow	Increases the aromatic quality of neighbouring herbs and deters a variety of insects.

Marigold planted under fruit trees and in the vegetable patch, especially near broccoli plants, will draw aphids away from fruit and vegetables.

Today many people make their own small herb gardens. Herbs have culinary and medicinal qualities. They can be sold as bagged plants or as fresh or dried herbs.

# Fruit Trees

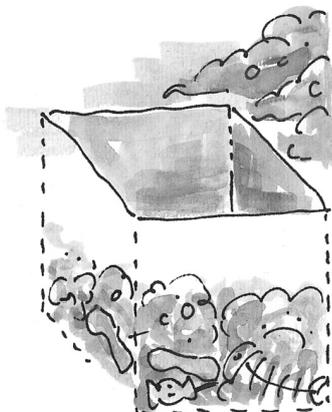
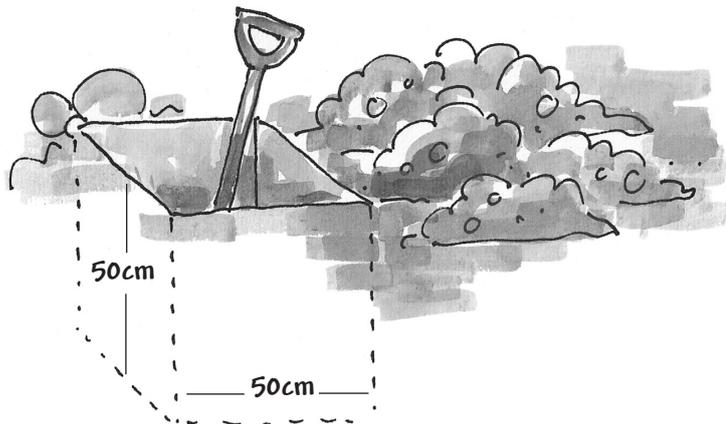
By planting fruit trees and caring for them, you are creating a food source that can last you for a lifetime.

It is important to select the best varieties for your climatic conditions and soil type. Observe your neighbourhood and identify fruit trees that are doing well. Speak to your neighbours, your local nursery or agricultural extension officer.

## Guidelines for planting fruit trees:

- Many fruit trees can be grown from pips, but it takes a very long time to grow and it does not always produce good crops. Generally you will get the best results from trees bought from a nursery.
- Fruit trees must be planted in full sun.
- Choose a site where the soil drains well and a slope is generally good.
- Place your trees correctly, at least three to four metres apart.
- Some fruit trees do not like wind, thus choose a protected site.

- Dig a square hole between half a metre and one metre wide on both sides and as deep.

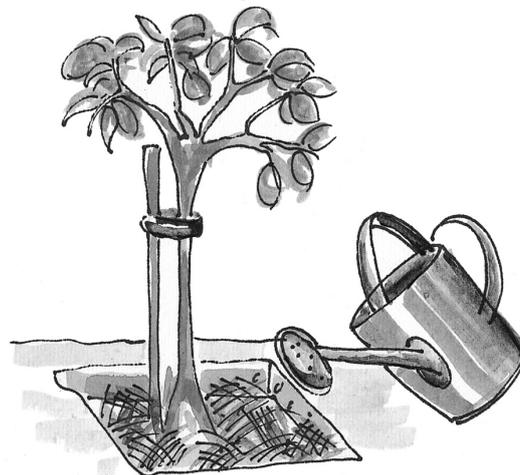


- Mix the loose soil with compost or old manure:
  - Poor soil: 1 part soil to 1 part compost
  - Good soil: 2 parts soil to 1 part compost

Or you can use your kitchen waste, mixed with soil in the hole.

- Add one to two cups of bone meal, if you have any available.
- Fill the hole with the mix and water the hole if the soil is dry.

- Remove the plastic bag/pot around the plant roots and try to keep the soil intact.
- Place the tree in the middle of the hole, with the stem straight up.
- Fill the hole with the soil and press it down firmly.
- Make a basin around the tree to hold the water.
- Water your tree well and put mulch around the tree to the edge of the basin.
- Be sure that there is protection from animals.



## Maintaining your tree:

- Water your tree once or twice per week for the first year; thereafter it can be watered every second week.
- Keep trees free from grass and weeds.
- Mulching around the tree helps the soil to hold moisture and prevents weeds from growing.
- If your garden is small or water scarce, you can plant vegetables and herbs in the basin around the tree.
- Feed your trees with compost or old manure at least once a year as follows:
  - Year 1 and 2: one bucket of compost/manure and half a cup of organic fertilizer.
  - Year 3 and 4: two buckets of compost/manure and one cup of organic fertilizer.
  - Year 5 onwards: three buckets of compost/manure and one to two cups of organic fertilizer.
- Most fruit trees need some pruning. You will learn more about it in “Food for Life – Gold”.



# Catching rain water

Rainfall purifies our water continuously. Rains are forever falling somewhere on the planet, but unfortunately these rains do not fall equally everywhere. Some places have a thousand times more rainfall than others. Africa is the thirsty continent: much of it is desert or semi-desert, with rainfalls below 500mm a year, and getting drier every year. Some years the rains do not come at all, causing drought, crop failures and famine. At other times there are floods that wash away soil, crops, people and their homes. Ninety per cent of Africa and South Africa is at risk from low or unpredictable rainfalls.

We therefore cannot take water for granted. But even if you know where to collect water it may not be the end of the problem. The water may be hard to reach, because it is deep below the ground level or a long way from home. Water is heavy to carry, dangerous to drink when untreated and expensive to buy.

Perhaps you do not experience these problems because you have taps (maybe many of them) inside your home. So water does not seem scarce or hard to get at all – it is there whenever you want it. You may even use it to flush bodily waste away (at 20 liters per flush). This is enough water to keep thirteen people alive for a day in places where water is very scarce.

It may therefore be difficult for you to accept that water is a precious and scarce resource in South Africa. But it is, and you can build your own water collector to collect water for your food garden.

- Place four poles in the ground during dry weather. Tie a clean sheet or a piece of cloth over the poles when it rains and place a container at the centre. Alternatively, use a plastic sheet with a small hole at its lowest point.



- Place a container under the outflow of your roof gutter, or place a wooden water diversion on the roof to direct water into a container. Do not collect the first rains for drinking purposes as the roof will not be clean yet.

- Use galvanised iron sheets to build a rain trap as illustrated below.



- Build a small earth reservoir lined with plastic to catch heavy rains. Siphon the water out at the lowest point.

### Suggestions to the Adult Leader

Look in “Be Prepared for Life, Kit Four: Water for life” for more ideas on collecting water, cleaning water and caring for water. You will find great ideas for activities for your patrol.



# Permaculture

Permaculture is an approach that uses a combination of methods to design and develop small growing and living systems. The idea is to develop an environment where all the different elements support each other to create a productive system, where the least amount of energy is used.

It is important to observe and make a list of all local resources which are available and how best to utilise them for maximum effect.

Some permaculture principles are

- Everything in the system must have at least two functions. For example a tree can be a windbreak, bear fruit and control erosion.
- There is a right time for everything, e.g. the season for planting a specific vegetable.
- Put things in the right place – where they are connected to, and supported by, other things (for example, the food garden is near a water source).
- Use biological resources – let nature do the work. Choose vegetables and fruit that are suited for the area.
- Plan for the system to be energy efficient – including human energy (put things that need the most attention nearest to your house).
- Encourage biological biodiversity (many different living organisms). Everything is connected to each other, e.g. aphids eat vegetables; ladybirds eat aphids; birds eat ladybirds. If a strong poison for aphids is used, it will kill the ladybirds and birds – there will be nothing to eat the aphids and you will not be able to get rid of them.
- Everything has a use. If you have a flat tin roof – use it to collect rainwater. Use the vegetable bags as shade cloth. Use all the kitchen waste for your compost. Keep milk cartons, plastic bottles, tins, egg boxes, and so on, to grow seedlings in.

Can you remember that these principles were used to decide on the best place for your vegetable garden in doing the “Food for Life – Starter” badge.

## Suggestions to the Adult Leader

To get a more in-depth knowledge and experience in permaculture, you can read books, visit permaculture projects or attend training courses.

### **Game to show how everything is connected:**

The ‘connection game’ is a clever game for scouts to understand how everything is connected. Make the scouts form a circle, facing inwards, and let each one pick a role, i.e. one is a pond, another a tree, one is the sun, another a worm. Take a roll of string and give the end of it to any of the scouts. This scout must then pass the string to another scout with a role that is connected to his (the first scout’s) role. For example, if the first scout is a “tree”, he can pass the string to a scout who is a fruit or a fence. The second scout must then do the same, and this process must be continued until the string connects everyone.

# Nutrition and Food Preparation

## Balanced diet

To stay healthy you need to eat a variety of food. To make it easier to follow a healthy diet, food is divided into groups according to their functions (the work the food does in the body). You should be eating enough food from each group daily.

### Group 1: Body-building foods

The foods in this group are rich in protein that is needed for building body tissues. They are very important for growing children. And although adults have stopped growing, their bodies also need building materials for maintenance and repair.

#### Milk and milk products:

Milk and milk products contain a lot of calcium that is needed for the building of strong bones and teeth and for healthy blood.

##### Examples:

- Mother's milk
- Fresh cow's milk (also other kinds of milk such as goat's milk)
- Dry milk powder (full-cream and skimmed milk powder)
- Other forms of milk (sour milk, maas, buttermilk, yoghurt, evaporated milk and condensed milk)
- Cheese

##### How much is needed daily?

- Children and adults need at least two teacups of milk.



#### Meat and meat substitutes

##### Examples:

- Red meat (beef, pork and mutton)
- Chicken
- Fish
- Eggs
- Cheese
- Dry beans, dry peas and lentils
- Soya products
- Peanuts and peanut butter



*How much is needed daily?*

- A piece of meat, chicken or fish the size of a woman's palm
- One egg
- A piece of cheese the size of a matchbox
- Two heaped tablespoonfuls (1/2 cup) of cooked dry beans, lentils or a soya product
- Two level tablespoonfuls of peanuts or peanut butter.

## **Group 2: Protective foods**

### **Vegetables and fruit**

Vegetables and fruit contain protective substances that help to:

- Protect your body from diseases.
- Heal wounds quickly.
- Make healthy blood.
- Keep your skin and eyes healthy.

All vegetables and fruit are good, but some are better than others.

Vegetables and fruit with deep colours such as dark green, deep yellow, orange and red are particularly good at keeping the body healthy. Examples are:

- Carrots
- Boer pumpkin
- Yellow sweet potatoes
- Beetroot leaves
- Spinach
- Leafy vegetables such as marog (imifino)
- Cabbage
- Green beans
- Peas
- Paw paws
- Mangoes
- Oranges
- Naartjies
- Tomatoes
- Guavas



When vegetables are cooked, some of the protective substances referred to above are destroyed. Therefore you should eat raw vegetables or fruit often. Some of the protective substances are also lost when vegetables are handled and prepared incorrectly.

*How much is needed?*

- Eat at least a cupful of vegetables daily.
- Eat a fruit as often as possible, but at least once a week. The best choices are oranges, naartjies and guavas.

### **Group 3: Energy foods**

Everybody needs fuel to supply them with enough energy for work and play and to enjoy life. This is provided by energy foods.

#### **Cereals and cereal products**

All cereals and cereal products provide energy.

*Examples:*

- Maize products: maize meal, samp and maize rice
- Wheat products: bread flour, cake flour, bread (white, brown or wholewheat) and pearl wheat
- Rice
- Breakfast cereals: oats, grain and sorghum
- Pasta: macaroni, spaghetti and noodles

Unrefined cereals and cereal products such as brown and wholewheat bread and unrefined maize meal are the best choices. The germ (heart) and the bran (outer layer), the parts that contain the most protective substances, are not sifted out of these products. Some brands of maize meal are enriched, which means that extra protective substances have been added to it. Always buy enriched maize meal if you can.

*How much is required?*

- The amount of energy foods you require will depend on your age and sex and on how active you are. Small children and elderly people need less than teenage boys who play soccer.
- You are eating correctly when a cereal product takes up most of the space on your plate. You should eat a cereal product, for example porridge, bread, rice or any other wheat or maize product, at every meal.
- Cereal products are good value for money.
- You are mistaken if you think that cereal products will make you fat.

#### **Fats and oils**

Margarine, butter, ghee, cooking fat, oil, salad dressing and mayonnaise provide mainly energy. Eat only small quantities daily, because too much fats and oils can make you fat.

#### **Other food**

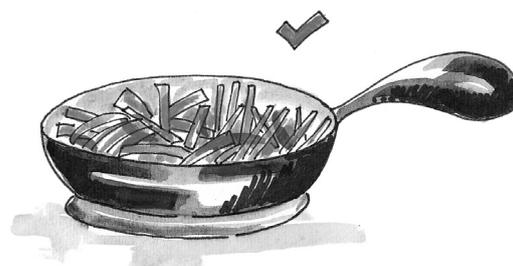
Sugar, jam, sweets, biscuits, cold drinks and other sweet foods also provide mainly energy. Small quantities of sugar help to improve the taste of food. However, sugar does not help to build the body or to keep it healthy. Do not buy too much of these foods; rather put money aside for good food.



## Food preparation

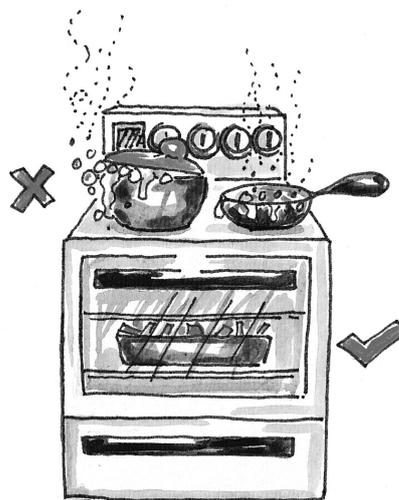
The best way to preserve the nutrition of vegetables is to stir-fry them. Do it as follows:

- Cut the vegetables into thin strips or squares, about 1cm wide.
- Heat a little oil or margarine in a pan.
- Stir-fry the vegetables until cooked.



You can also bake vegetables in the oven:

- Cut the vegetables as above.
- Sprinkle oil over the vegetables.
- Bake in the oven until cooked.



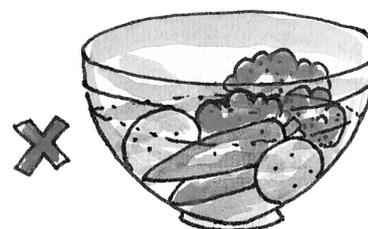
Vegetables that you can stir-fry or bake in the oven are carrots, sweet potatoes, beans, peas, mealie pips, pumpkin, root vegetables, onion, broccoli (broken into florets), cauliflower (broken into florets), cabbage and garlic. You can add some of your herbs, like rosemary and thyme.

You can also boil vegetables, using only a little bit of water in a pot with a lid on. Do not cut the vegetables before washing them. Rather cook them whole with the skin on, and cut them after cooking. You should use so little water that there should not be any left to throw away when the vegetables are cooked. If you do have water left, do not throw it away, but rather use it for soup or gravy. Vegetables that can be boiled are squashes, potatoes, maize, peas, pumpkin, root vegetables, onion, broccoli (broken into florets), cauliflower (broken into florets) and cabbage.

You can eat some vegetables raw as well, e.g. cauliflower, carrots and peas.

Eat vegetables as soon as possible after harvesting.

If you peel vegetables and wash them, you should not let them lie in the water, but use them immediately. If they lie in the water, valuable vitamins are lost. Rather scrub them with a hard brush and then rinse them.



# Food for Life – Gold



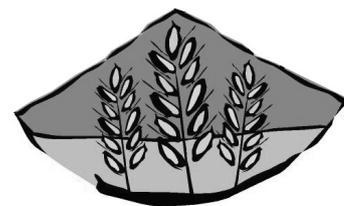
## Objective

By the completion of this stage the Scout would have the ability to draw up a business plan and apply the knowledge gained.

## Badge Requirement

To obtain the badge you should be able to do all of the following:

1. Completion of the Food for Life – Silver Badge is a prerequisite for this badge.
2. Draw up a basic business plan, which includes:
  - (a) Name of the business;
  - (b) Market place – where you will sell your produce and who your customers will be;
  - (c) Product – what you will be selling;
  - (d) Budget – how you will keep accurate record of income and expenditure and how much you will charge for your products;
  - (e) Staffing – who will be responsible for each job; and
  - (f) Marketing – how will you market your product, including a poster or banner that you will use.
3. Do one of the following:
  - (a) Pickle a vegetable
  - (b) Make jam
  - (c) Dry a vegetable or fruit
4. Grow two types of vegetables and donate them to a worthy cause or help an orphanage, old age home, church, etc. to start a garden.
5. Explain how you will test the type of soil that you have.
6. Explain two types of irrigation that you can use for your vegetable garden.



# Introduction

In this phase of the agricultural skills programme you will learn:

- How you can sell your excess vegetables (entrepreneurship).
- Packing and preserving of the vegetables/fruit/herbs.
- More about soil types: sandy and clay soils.
- How to plant and harvest different fruit trees.
- How to irrigate fields.

## Entrepreneurship

The Scout has started his or her garden and it is producing more than the family needs. It is now time to start a business. By starting a business venture, the Scouts will learn valuable lessons and skills that will be very useful to them in future – skills which can prepare the Scouts for the real world and enable them to simulate, without risk, the lessons of life. As your community sees the Scout getting involved in entrepreneurial skills, you can expect that there will be a greatly enhanced perception of what Scouting can do for all youth!

The first step in starting a business is the drafting of a business plan. This is normally presented to a bank or other potential funder, but it is useful even if not needed for this purpose, because it helps you to plan the business properly.

## Drawing up a Business Plan

The following table sets out the details that should be included in a business plan:

Heading	What this involves	Reference to guidance
Name of the business	<ul style="list-style-type: none"><li>• Give your business a name.</li><li>• Provide your contact details.</li></ul>	
Background	<ul style="list-style-type: none"><li>• Give details of when you started your garden and what you will use the produce of the garden for.</li></ul>	
Vision (your dream for the business)	<ul style="list-style-type: none"><li>• What you want to achieve by starting the business.</li></ul>	

<b>Heading</b>	<b>What this involves</b>	<b>Reference to guidance</b>
Products (what you are going to sell)	<ul style="list-style-type: none"> <li>• Describe the product that you are going to sell.</li> <li>• What is good about the product.</li> <li>• The price compared to competitive products.</li> <li>• If you are going to process your fruit or vegetables (e.g. make jam or dry them), explain how you are going to do it.</li> <li>• The packaging of your product, e.g. what your containers and labels will look like or how you will pack or display your fresh vegetables, fruit and herbs.</li> </ul>	Page 58
Markets (who are you going to sell to, and where)	<ul style="list-style-type: none"> <li>• Your customers.</li> <li>• How you will sell your product.</li> <li>• Where you will sell your product</li> <li>• Competitors, and what you can do better than them.</li> </ul>	Page 59
Marketing plan (how you are going to sell your product)	<ul style="list-style-type: none"> <li>• How people will know about your product, and how can they get hold of it.</li> <li>• Make a poster to advertise your business.</li> </ul>	Page 61
Staff	<ul style="list-style-type: none"> <li>• Who will manage the business.</li> <li>• Who will sell the product.</li> <li>• Who will do the bookkeeping.</li> </ul> <p>(You can do it all yourself or your parents or friends can help you.)</p>	
Budget	<ul style="list-style-type: none"> <li>• A detailed budget of your income, costs and profits.</li> </ul>	Page 61



# Guide to drawing up a business plan

The following is a guide on how to write some of the sections in the business plan.

## Product

In order to decide on the best product for you to sell, you can follow the following thought process:

- Make a list of products that you can sell, e.g.:



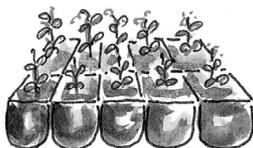
- Fresh fruit and vegetables to your community.



- Dried fruit, vegetables or herbs to your community. You will need to build food driers for drying the produce and then sell it in bottles or packets.



- Jam made with fruit from your own trees, as well as wild fruits. You can ask your friends, family or a local church group to collect screw-top bottles for you. You can ask your parents to wash and sterilise the bottles so that they are ready to use.



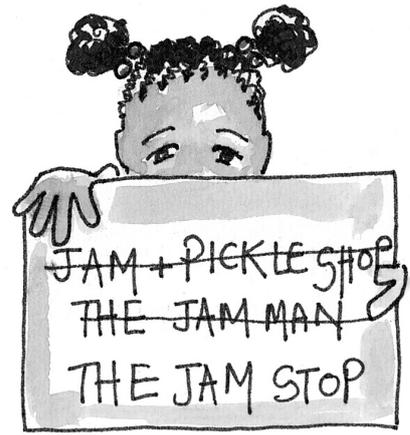
- Sell vegetables or fruit or herb seeds or seedlings. (You can start your own nursery.)

- Make a preliminary choice of a product.
  - This involves choosing the best product from the ones you have listed.
  - Make a list of factors to help you choose the best product, e.g. will this product sell in my area?
  - Is there anyone else nearby offering the same product? Survey the shops and markets in your area.
  - Is there someone who could give you advice on which product to select?
  - Does it interest the community? Will they support you?
  - Are there any other important considerations?
- Do you know how to make the product?
  - Where can you find out what you need to know?
  - Who can help or advise you?
  - How long will it take to make it?
- Make samples of the products you want to sell.
  - Keep records of how you make it.
  - Keep records of what it cost to make.
  - Keep records of how long it takes to make each item.
  - Try to improve your techniques and become more efficient – be creative.



- Take samples of your products to some potential buyers (e.g. family, friends, and neighbours) and ask them:
  - If they would be prepared to buy something like it.
  - How much they would be prepared to pay for it.
  - How it could be improved.

You can now decide on a name for the business. As a business name is often descriptive of the business, it is a good idea to choose a name only after deciding on a product.



## Market

You should look at the following aspects when you decide who you will be selling to:

- Customer profile
  - Who is going to buy from you?
  - Where are they?
  - Are they currently buying a similar product from someone else?
- How will you sell it?
  - How will you bring it to potential customers' attention?
  - How will you get it to them?
  - When is the best time to sell it to them?
  - Are you going to ask others to help you sell it?
- Where will you sell it?
  - You can organise a market day at your Scout group, church or meeting place where the community can buy produce from you.
  - You can sell door-to-door to your neighbours.
- Are there competitors?
  - Do you have competitors who are providing a similar product at a competitive price? Record their products, prices, quality, where they sell and their marketing methods.
  - Can you change your product(s) so that you offer something that none of these competitors do? For example: perhaps a number of people are selling fresh vegetables and you need to sell another product or identify another market. Is there a restaurant or hotel in your area? Find out if they will buy organically grown fresh produce, like sun-dried tomatoes, artichokes and baby vegetables, from you. If they are willing, find out what vegetables the hotel or restaurant needs, as well as what quantities and how often, so that you can plan your planting accordingly. You will then need to find a way to get the vegetables to the buyer on a regular basis.





- Do a study of your:
  - Strengths: why are you better than your competitors, e.g. you are closer to your market, your fruit is exceptionally fresh or your prices are better.
  - Weaknesses: why are your competitors better than you, e.g. their produce is cheaper, or they have a wider selection of vegetables and jams.
  - Opportunities: what opportunities are there to gain customers? What can you do to increase your market or profits? Are you going to diversify your product range, e.g. move from selling only fresh fruit to making and selling jams as well.
- Decide why you are better than your competitors.
- If you need to deliver your product
  - How are you going to deliver it to the buyers?
- How many items do you think you would be able to sell?
  - Will you have them ready in time?



## Marketing plan

In order for people to buy a product, they need to know that it exists (and it has to be a good product at a good price, of course!). Getting publicity is an important aspect in establishing a successful business. How are you going to become well known, preferably at little or no cost?

Here are a few ideas:

- Take part in events such as markets or open days where people can set up a stall with advertising posters.
- Shops, churches and community centre notice boards: make use of these free advertising spaces. You can make posters on the back of other old posters (e.g. ask local shops to give you their posters at the end of in-store promotions) or on old cardboard boxes.
- Radio: most radio stations have a community slot. Make a note of the presenter and phone number and give the station a call, or write the station a note – radio is an effective way to reach many people.
- Newspapers and magazines: many newspapers have a diary/coming events/community services section. Send your details to the person in charge of this. Find out what magazines are read in your area and ask the editor to place a story about what you are doing.

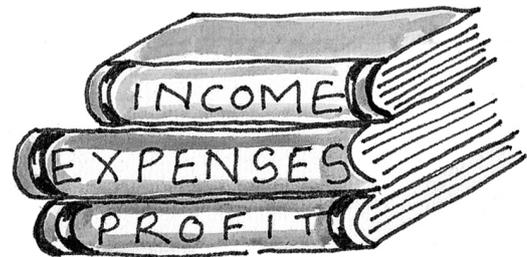


Remember to include the cost of marketing/publicity in your budget!

## Budget

You need a budget to plan and control your income, costs and profits. When you compile a budget, remember to consider the following:

- Income: calculate what you think your income will be.
- Costs: will you be using electricity or water? How will it be paid for? Also stationery, telephone, transport, delivery of goods, materials (bottles and other equipment), marketing (labels, posters and packaging), seeds and tools.
- Equipment: do you have all the equipment that you need? If not, can you get it?
- Do you expect to make a profit? You will make a profit if your income is more than your costs, and it is therefore very important that you remember to take all expenses into account (as indicated above).



A budget can look like this:

<b>Budget</b>	
<b>Income</b>	
50 vegetables @ Ksh 20.00 each	Ksh 1000.00
10 jams @ Ksh 120.00	Ksh 1200.00
<b>Total income</b>	<b>Ksh 2200.00</b>
<b>Costs</b>	
10 Bottles @ Ksh 5.00	Ksh 50.00
Seeds	Ksh 100.00
Sugar	Ksh 190.00
Marketing poster	Ksh 30.00
Spade	Ksh 350.00
Total Cost	Ksh 720.00
<b>Profit (Total income - Total cost)</b>	<b>Ksh 1480.00</b>

## Capital requirements

Do you need to invest further money in the business in addition to the basic expense items above?

- E.g. do you need to rent additional land?
- Are you going to dry your fruit or vegetables? Will you need to rent additional space to do it, and do you need driers?

By doing the above you will learn valuable entrepreneurial skills!

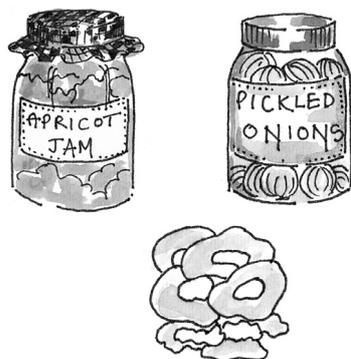
### Suggestions to the Adult Leader

- Let the Scouts discuss their ideas within the patrol.
- Let them make a poster of their business plan.
- Let them make a poster showing their action plans, and keep it updated.



# Packing and preserving of the vegetables/ fruit/herbs

Vegetables and fruit can be kept in the fridge for later use, but not everyone has a fridge. But there are ways of making your own fridge – have a look at your Scout Trail to see how this can be done. Since many people cannot store their food in refrigerators, food preservation is important as this makes it possible to store the excess harvest for future use.



Most of the fruit we grow in our gardens can be preserved in sugar as jam, while vegetables can be pickled in vinegar. In hot climates apricots, peaches with loose pips and figs can be sun dried by halving them and laying them out in the sun to dry on wooden trays until the excess moisture is lost. The fruit that are being dried must not be left outside overnight. The dried fruit can be softened by soaking or boiling them in water. A food drier can be built to dry sun-dried tomatoes that will generate a much higher income than selling fresh tomatoes.

The best time to harvest herbs is between ten in the morning and twelve noon because this is when the plants' oils are active.

## Drying of herbs:

- Small-leaved herbs like thyme, rosemary and parsley: hang bundles in a warm, dry airy spot.
- Larger-leaved herbs: strip the leaves and place them on a wire rack in an oven on its lowest setting. When the herbs are dry, crumble them between the fingers and then store in airtight containers.



## Freezing of herbs:

1. Chop the herbs finely
  2. Fill ice cube trays with the herbs
  3. Top up with water and freeze
  4. When herbs are needed, put the ice cube in the food.
- or
1. Boil sprigs of herbs in water for a half a minute.
  2. Dry on paper (e.g. absorbent kitchen paper or newspaper) and store in plastic bags.
  3. Put the bags in the freezer.
  4. When herbs are needed, crumble the frozen herbs into the dish.

Look in Be Prepared for Life, Kit Three: Food for Life for more great ideas on how to preserve vegetables and fruit.

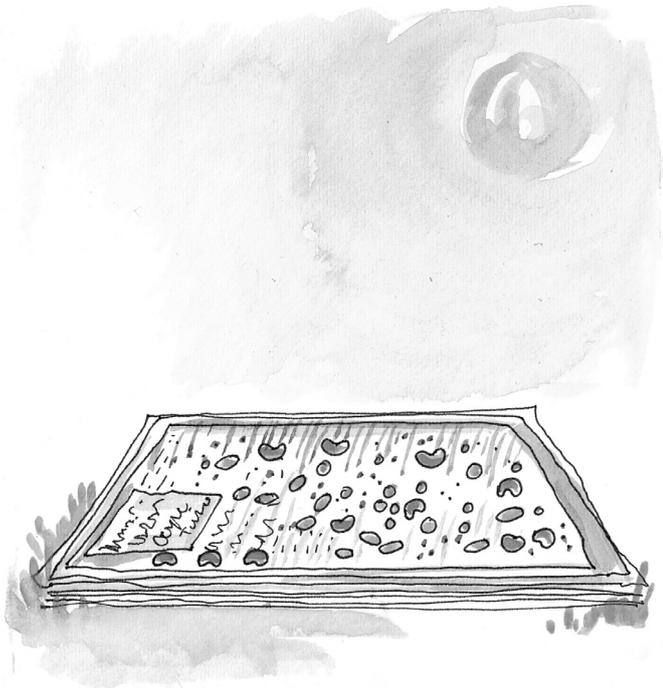


# Harvesting seed for re-grow of crops



Saving seed will enable you to save money, and even to eventually earn money. Collecting the seeds from your garden and placing them in containers for future use is good permaculture practice. It is best to collect seeds on a clear and sunny day – if it is damp or raining, the seeds will rot or germinate right away.

Select plants that are healthy (do not have diseases) and that produce fruit or vegetables that are of a good size, shape and colour and taste good. On a sunny day, pick a mature fruit or vegetable from such a plant. It has to be done on a sunny day, because the seeds need to be sun-dried as soon as possible. Slice the fruit or vegetable and take out the seeds that look best. Paw paw and tomato seeds should be washed before drying. Then dry the seeds by placing them on a sheet of newspaper in direct sunlight. After drying, treat the seeds by mixing them with substances that will protect them from attack by insects. Such substances include woodash, agricultural lime or finely powdered clay. The seeds should then be stored in a bottle (preferably a dark coloured one) or other airtight container. Try to avoid using plastic, if possible. Put a substance that absorbs moisture like rice or dry ash in the bottle with the seeds, and keep the bottles in a dry, dark and cool place. Mark each container to enable you to identify the seeds.



It is not advisable to save seeds from “hybrid” vegetables. Vegetable seed packets that say “F1 Hybrid” on them contain seeds that have been produced by crossing two types of vegetables to combine their good characteristics. However, when you save the seeds of such plants and try to plant them the next season, they may not grow at all, or may revert back to one or the other of the “parent” types.

## Service Idea

Why not give vegetables to a worthy cause, e.g. to an orphanage, HIV/AIDS sufferers or old-age home, or assist a needy organisation or person to make a vegetable garden?



# Understanding soils

Every living being needs air, water and food. If we take away any of these ingredients, the person, plant or animal will die. It is the same with soil, and farmers talk about soil being alive or dead. Soil can suffocate, drown, starve or die of thirst, heat or cold. But fortunately for us soil can also be healed.

## What is soil and what gives it life?

Soil comes from rocks that have been broken up, by exposure to sun, rain and wind, into millions of tiny grains and particles. The soil on the earth's surface is known as topsoil, and it is where plants live and grow. Topsoil is made up of soil particles, air, water, organic matter and soil life (micro organisms).

## Soil types

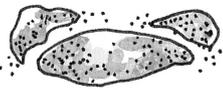
The size of the soil particles determines the type of soil. What type of soil do you have?

- **Sandy soil:** made up of big particles. It contains lots of air and water passes through it quickly. It therefore dries out quickly and plant food is washed away easily. It is easy to dig.
- **Clay soil:** made up of small particles. It holds water well, but contains little air. Clay soils are heavy and often very hard or sticky, and this can prevent proper root development. Clay soil is difficult to dig. Digging helps to loosen the soil and introduces more air to the soil.
- **Loam soil:** made up of a mixture of sand and clay. It holds water, but still allows for air movement in the soil.

Here is an experiment that you can do with soil to determine which of the types above it is. Pick up a handful of the soil, wet it a bit and roll it into a sausage in your hands.



## The Ring Test for Soils

When rolled	Damp sample	The soil is ...
Cannot be rolled into a sausage		Very Sandy
Can be rolled into a sausage but can't be bent		Sandy
The sausage can bend a little		Sandy Loam
Sausage bends half way round finger		Loam or Silt Loam
Sausage bends more than half way round finger		Clay Loam or Sandy Clay
Sausage bends into a ring		Clay
Sausage bends into a ring with cracks		A short Clay
Sausage bends into a ring with no cracks		A fat Clay

## What make soils alive and healthy?

Organic matter, macro organisms and micro organisms are required for healthy soil.

**Organic matter** is made up of the decomposed (broken down by rotting) remains of plants and animals, and is called compost and manure. This material is the food that feeds the life in the soil (macro and micro organisms) and makes the soil fertile.

**Macro organisms** refer to worms, spiders and insects. They help to break down the organic matter in the soil and turn it into food for micro organisms and plants. They can also improve soil conditions by loosening and airing the soil.

**Micro organisms** are microbes, bacteria, fungi and viruses that cannot be seen without the aid of a microscope. There are millions and millions of these organisms in even a small quantity of soil. These organisms help plants to grow by becoming and making plant food in the soil. They make the food by helping dead plant and animal waste to rot and decompose, creating a material called humus. Humus is the dark, rich part of the soil, and is very rich in nutrients. Soil that contains lots of humus is very healthy, and can provide lots of nutrients to plants over a long period.

## A healthy environment for the soil

A healthy environment for soil consists of the following:

- Proper moisture and temperature levels in the soil.
- Enough air to sustain the living processes in the soil.
- Lots of organic matter to feed soil life and plants and retain moisture in the soil.
- Lots of soil organisms to break down organic material.
- Trees, plants and grasses to protect and feed the soil.
- Animals, birds and insects to feed the soil and help plants produce and spread their seeds.

## Soil nutrition (the organic way)

To create healthy, living soil in our garden we need to do the following:

- **Make compost heaps:** collect plant materials and manure and mix them into heaps (see compost making). This is one of the best ways of making plant food to feed the soil. You can also make compost using an earthworm farm.
- **Make trench beds:** when you prepare a trench bed, you are in fact making a compost heap in your trench and then covering it with soil. This allows for you to plant your bed immediately, as you do not have to wait for the materials to decompose (rot).
- **Use animal manure:** manure is plant material that has been digested by an animal. It is best to use older, matured manure, because fresh manure can burn plants. Old manure can be spread over a bed and dug into the soil.
- **Mulch your garden beds:** soil can be covered with a layer of materials like leaves and straw that we call a mulch. This helps to create a better environment for soil organisms by maintaining moisture and temperature levels.
- **Green manure crops:** plants in the bean family (like beans, peas, lucern and lupines) are good soil builders. The little nodules (bumps) on the roots allow them to take nitrogen from the air, and fix it in the soil. (Nitrogen is the main nutrient that makes plants green and grow fast.) Let them grow till they make flowers, and then dig them into the soil.
- **Natural fertilizers:** use, for example, bone meal and wood ash.
- **Liquid manure teas:** These can be made from animal manure and certain herbal plants (see liquid manure).

By doing the above we are copying nature's way of creating fertile soil. These forms of organic matter support life in the soil and improve plant growth.



- They supply food for the macro and micro organisms in the soil.
- They improve soil structure by helping to:
  - bind sandy soils, thus helping the soil to hold water and plant nutrients longer.
  - loosen clay soils, which improves drainage and increases air movement in the soil. This allows better root development.
- Many of the materials used can be collected for free, while others cost very little.

## Chemical fertilizers (the non-organic way)

In an organic or natural approach to gardening and farming chemical fertilizers are NOT used, because they:

- do not feed life in the soil (micro organisms), and ongoing use kills soil life.
- do not help to improve the soil structure of sandy and clay soils.
- create an imbalance in plant growth, which makes them more vulnerable to attack by pests and diseases.
- are expensive.

# Fruit trees

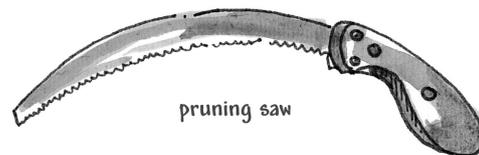
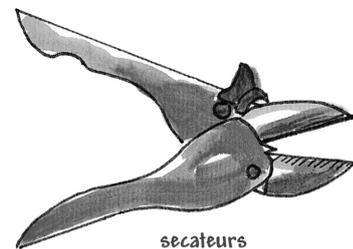
Various kinds of fruit trees can be planted, of which apricot, fig and peach trees are the easiest. Most fruit trees need to be pruned every winter. This is important, because pruning ensures good quality fruit. We will first look at pruning of fruit trees in general and will then discuss different fruit trees, where and when they can be planted and whether they have specific pruning needs.

## Pruning

As mentioned above, it is important to prune your fruit trees. Pruning means that you cut some branches of the tree to ensure that the remaining branches grow better and receive enough sun. It is best to prune fruit trees in winter when they do not have leaves or bear fruit, as it will ensure healthier fruit. You must only prune on dry days, because trees can easily get diseases if pruned on rainy days.

### You will need the following equipment:

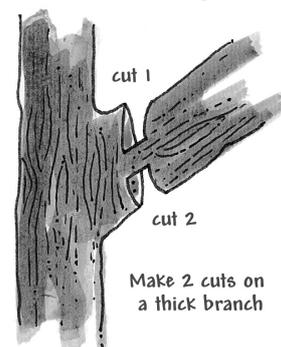
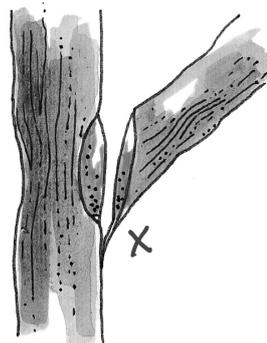
- Secateurs (pruning scissors) for cutting off small thin branches;
- a pruning saw for cutting big branches; and
- Jik or Jeyes Fluid for washing the secateurs and saw after pruning each tree. If you prune a tree with a disease and you do not clean the secateurs, or saw, the disease will spread to the other trees that you prune.



### How to cut the branches:

- Always use the secateur or saw to cut off the branches – never break a branch off.
- Thin branches should be cut off at an angle, just above a bud.
- If you are cutting a thick branch, you should not cut it off right next to the trunk. You must cut it about 10cm from the trunk, at an angle. This will ensure that the water can run off the cut part of the branch. If you cut the branch closer than 10cm from the trunk, you might damage the bark of the tree. And if you cut it more than 10cm from the trunk, the branch might get a disease that will spread to the rest of the tree and the tree can die.
- If you are cutting a thick branch, you should cut it from the bottom, as well as the top. If you don't do this, the branch might break and tear a piece of the bark off.
- To stop the tree from bleeding and getting a disease, you need to seal the branch, where you cut it. You can seal the branch by using the thick glue that comes from pine trees and from blue gum trees, or tree sealer sold by a gardening shop. Never use paint on it!

Cut sloping up towards bud and just above it



Make 2 cuts on a thick branch

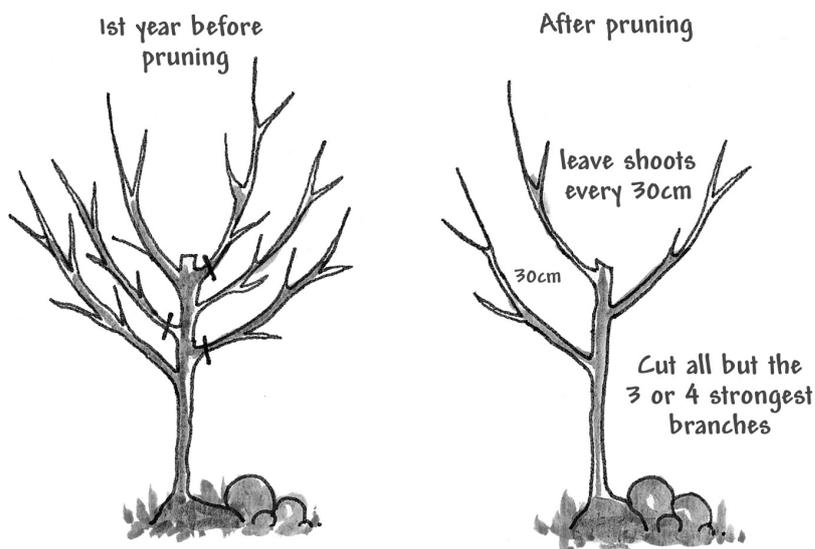
## How much to prune?

### After planting the tree:

- Trees are weak when they have just been planted. This is because it takes the roots time to get established after planting. If you prune the tree after planting, it will help the roots to grow strong again.
- Cut off the top of the tree and all the small thin side branches, but do not cut off the thick, strong branches.

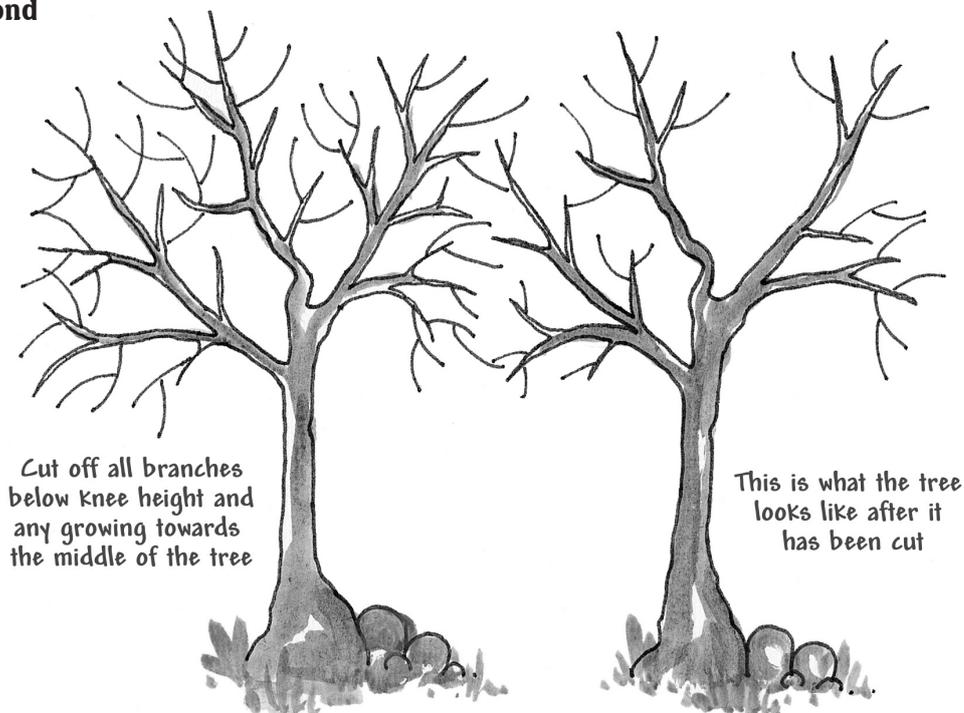
### Pruning in the first year (cold season):

- During the first year pruning, leave the three or four strongest branches. There will be smaller branches on these stronger branches. Leave one small branch every 30cm and cut all the others off. The tree should be pruned in such a way that all the branches will receive sunlight.



### Pruning in the second year (cold season):

- Cut off all the small branches lower than your knee, and all new branches growing in the middle of the tree.



2nd and 3rd years

### Pruning in the third year (cold season):

- Cut off all the dead branches and all the new branches growing in the middle of the tree.
- Prune like this until the tree stops to grow. After this, you do not need to prune your tree any more, only if it is producing lots of small fruit. Pruning will help the tree to produce less, but bigger fruit.



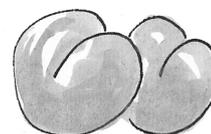
## Specific Fruit

### Apples

- Where:** They grow best in places with a cold climate.
- When to plant:** Cold season.
- Soil:** Well-drained soil.
- Planting:** You need to plant two different varieties in the same place. If you only plant one tree, the tree will only bear flowers and no fruit.
- Harvesting:** The apples on the side and top of the tree will be ready for picking, before those in the middle of the tree. They should be picked before they are ripe.
- Storing:** In a dark, dry place.

### Apricots

- Where:** In places that have cool seasons with not too much frost or wind.
- When to plant:** Cool season.
- Soil:** Well-drained.
- Planting:** Allow 3m between an apricot tree and another larger growing tree. Plant in well-prepared holes. The tree must be watered well to ensure plenty of fruit, especially during long dry spells.
- Harvesting:** The fruit is ripe in February and March. When ripe it is soft to the touch.



### Avocados

- Where:** The tree needs lots of rain and warm climate. It does not grow very well in very hot or very cold places, as it is damaged by hot dry winds and frost.
- Soil:** Well-drained, slightly acid soils.
- Planting:** Can be planted anytime. Dig the hole at least four weeks before planting. You should plant the tree 10m from other trees. It can be grown from a pip. Plant the pip in a plastic bag or large tin filled with a mixture of soil and compost. Take the brown skin off the pip first and push it into the soil, with the pointed end down and the flat end sticking out of the soil. Cover the soil with grass and water it daily. When the tree is as high as your knee, it can be planted in the garden. Keep the soil around the roots when you plant. It can take 10 years for avocado trees grown from pips to give fruit.
- Harvesting:** Avocados can be picked if they are ripe or green. They will ripen in seven days time.



## Bananas

**Where:** Along the East African coastline and in the frost-free areas of the Great Lakes region. They need lots of rain.

**Soil:** Clay soil that stays wet for a long time after rain.

**Planting:** You can grow banana trees by planting the suckers that grow around the bases of old trees.

- The suckers are joined to the trunk of the tree under the ground. The best suckers to use for new trees have thin leaves and are about as high as your knee.
- Cut the sucker away from the old tree and take off all the roots and leaves. It is important to take the roots off because banana suckers often have eelworm disease. After you have taken off the roots, dip the suckers into eelworm poison.
- Plant the suckers in the cool season at the beginning of the planting season. Dig a hole 70cm square and make it deep enough so that you can bury the sucker in 15cm of soil. If you are growing lots of banana trees, plant them in rows 3m apart.

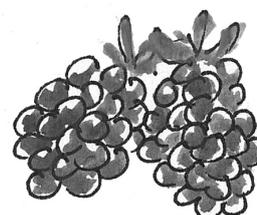


**Pruning:** Four months after planting, cut away all the suckers except one. This sucker will take over from the old tree and give you bananas in the next year. The suckers you have cut will grow up again. After another four months, repeat the process and cut away all the suckers except one. Now you will have the old tree consisting of one large sucker and a small sucker.

**Harvesting:** Pick the bananas when the sides start to become round, but before they go soft. After you have picked the bananas, cut the top of the old tree off so that it is as high as your shoulder. Scatter the old leaves and pieces of stem around the base of the plant. This stops weeds from growing and is good for the soil.

## Berries

**Where:** Boysenberries, loganberries, tayberries and youngberries grow well in most parts, except in those regions that experience severe frost. Strong winds and heavy rains can damage flower buds, while heavy rains and humid weather may spoil ripening fruit.



**When to plant:** At the beginning of the cold rain season.

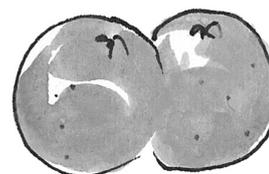
**Planting:** Plants should be grown along a fence. Plant the berries about 2,5m apart along the fence in well-prepared planting holes.

**Pruning:** Correct and routine training and pruning of the berry plants is essential for a heavy crop or fruit each season.

**Harvesting:** Fruit should be ready for picking during the mid-dry to late dry season – the berries will then be well-coloured and sweet.



## Citrus



- What:** Citrus trees are oranges, naartjies, lemons and grapefruits.
- Where:** Prefer cool and warm to hot temperatures. They produce the best in frost-free areas, but can be grown anywhere in the East Africa region, except where there is severe frost.
- When to plant:** Any time of year.
- Soil:** Well-drained.
- Planting:** They need more water than other fruit trees. If there is no rain when they are flowering or when the fruit starts to grow, give them plenty of water every three weeks. The area around the base of the tree must be heavily mulched and nothing should be planted around it as it has a shallow root system. The sun easily damages the trunks of citrus trees, so wrap them in sacks or newspapers, or paint them with whitewash until there are enough leaves to shade them. A citrus tree needs food three times per year – give it the following amount of balanced organic fertiliser:

Year	October	March	June
1	0,1kg	0,3kg	0,5kg
2	0,7kg	0,9kg	1,1kg
3	1,3kg	1,5kg	1,7kg
4	1,9kg	2,1kg	2,3kg

From the fifth year on you must feed the trees three times a year with 2,5kg of fertilizer.

- Pruning:** No pruning is needed, except for cutting off dead branches.
- Harvesting:** The fruit is ready when it is fully coloured.

## Figs



- Where:** Nearly everywhere in East Africa. It should be done during the dry season when it is warm and fairly dry, and towards the end of the rain season. Heavy rains during the rain season when the fruit ripen can cause it to split.
- When to plant:** Plant in cool seasons.
- Soil:** Well-drained, alkaline soils.
- Planting:** Should be planted well away from buildings and walls, as they have large root systems. The area around the base of the tree should be mulched.
- Pruning:** Do not prune the first few years. After that, prune only a little every winter.
- Harvesting:** Figs should ripen on the tree. Harvest figs twice a year – during early and late summer. They should feel soft to the touch and when you pick them, no white juice should come out of the stem.

## Granadillas

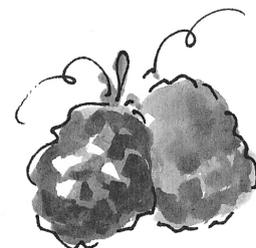
**Where:** Can be grown throughout the country, but do best in warm, frost-free regions.

**When to plant:** Any time during the year.

**Planting:**

- Granadillas grow well along a fence, and can be used as a fence around your vegetable garden.
- They are short-lived plants with a productive life span of only about five years.
- They should be planted about 3m apart.
- Plants should be kept mulched with a thick layer so that the soil will retain water, but will still drain well.
- Allow the main stem of a newly planted granadilla to reach the top of its support by removing all the side stems, then pinch off the growing tip. As the new side shoots develop, tie them along with supporting wires.
- After the plant has flowered and produced fruit, thin out weak, overcrowded or dead shoots and cut back the main stems to about 60cm above the ground.
- Spray the flowers and leaves with water in hot, dry weather.

**Harvesting:** Harvest once the fruit turns dark purple and the skin begins to wrinkle.



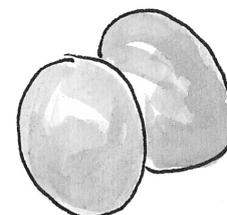
## Guavas

**Where:** Grow well in warmer areas. Can also be grown in colder areas, but will then have to be sheltered from frost and cold winds.

**When to plant:** Any time during the year.

**Pruning:** Prune the tree in October, after harvesting all the fruit. Leave about six buds on each branch.

**Harvesting:** Guavas are ripe from August to December. They are ready for picking when their skins turn yellow.



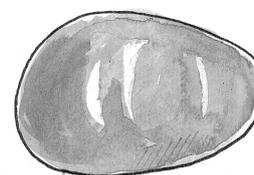
## Mangoes

**Where:** Hot dry places. They do not grow in places where the seasons are too cold because young trees are killed by frost.

**Soil:** Grow in all soils, even stony and sandy soils.

**Planting:** You can grow trees from smooth pips. To do this, carefully take the hair and skin off the pip. Keep it between two pieces of wet sack until it starts to grow, which should happen after about a month. Then plant it in a plastic bag full of soil, and let it grow as high as your knee. You can then replant the tree in the ground. Plant it 10m away from other trees, because mango trees become very big.

**Harvesting:** Pick mangoes when the skin starts to become orange.

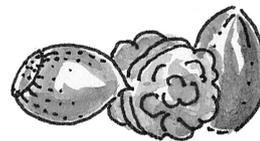


## Mulberries

- Where:** All parts of East Africa.
- Soil:** Well-drained.
- Pruning:** Do not need any.
- Harvesting:** When they are black and easy to pick.

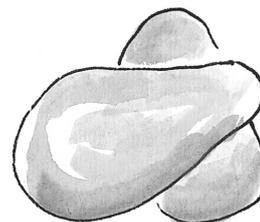
## Nuts

- What:** Macadamia and cashew nuts.
- Where:** Cashew nuts are grown along the coastline and macadamia in most parts of the region.
- When to plant:** During the short rain seasons.
- Soil:** Not too sandy or brackish.
- Pruning:** They do not need pruning.
- Harvesting:** They are ready for picking when they start to fall off the tree, or when the shells start to crack open. Keep them in a dark dry place and they are ready to be eaten, when they are dry.



## Paw paws

- Where:** Grow well in tropics especially in warm climates. The tree is not easily killed by drought.
- When to plant:** At the beginning of the rain season. (March is a good time).
- Soil:** Well-drained soil that is not too acidic.
- Planting:**
- With paw paws, the male and female flowers are produced on separate plants. You will thus need more than one tree in your garden.
  - Plant the seeds 2m apart, and place about five seeds in each hole. Do not use any compost or manure in the holes.
  - You will have to wait for the seedlings to flower to establish which plants will carry the female and which the male flowers.
  - Do not pull the weak seedlings out, as they are often the female flowering plants. Wait until the plants are 1m high. The female flowers are larger than the male ones and they are usually single, or form small clusters. The male flowers grow in long hanging clusters that can be up to one metre long.
  - One male flowering plant can pollinate up to twenty female flowering plants. So you only have to keep one male flowering paw paw tree, while you can have as many female flowering ones as you wish.
  - Mulch should not touch the trunks.
  - Paw paws do not like having other plants close to them.

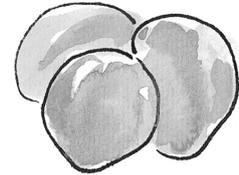


- You get the best fruit from the tree in the first two to three seasons, whereafter the quality of the plant's fruit declines.

**Harvesting:** December to August. Harvest while the fruit is still slightly green – the fruit will ripen after picking.

## Peaches and nectarines

**Where:** They grow everywhere in the cool moist climates, but they grow best where the dry seasons are hot and the rain seasons cold. It is important that the temperature must drop sufficiently in the cold rain season.



**When to plant:** At the beginning of the rainy season.

**Soil:** Well-drained soil.

**Planting:** Trees should be planted 3 to 5m away from other trees and one another.

**Pruning:** Prune as was described earlier, but also remember the following. When cutting the side branches from the four main branches, you should leave all the branches that have three buds and cut off those that have only one or two buds. It is also important to thin out the fruit: the first time when it is the size of a marble, and the second time when it is the size of a small egg. After the second thinning out the space between fruit should be approximately 10cm. This will give you a harvest of bigger peaches.

**Harvesting:** Pick when they are ready to eat, because they do not ripen after picking. You will get the best fruit if you only pick the fruit when soft to the touch, but because of fruit flies you may have to pick the fruit when still slightly under ripe.

## Pears

**Where:** Places with cold moist seasons and mid to late rain seasons.

**Soil:** Any soil, except very sandy soil that dries out too quickly.

**Planting:** Cold seasons. Plant two different varieties of pears next to each other so that they will bear lots of fruit. It takes six years before the tree starts to give fruit.

**Pruning:** Same as peaches.

**Harvesting:** Pick before they become ripe. Store in a dark place.



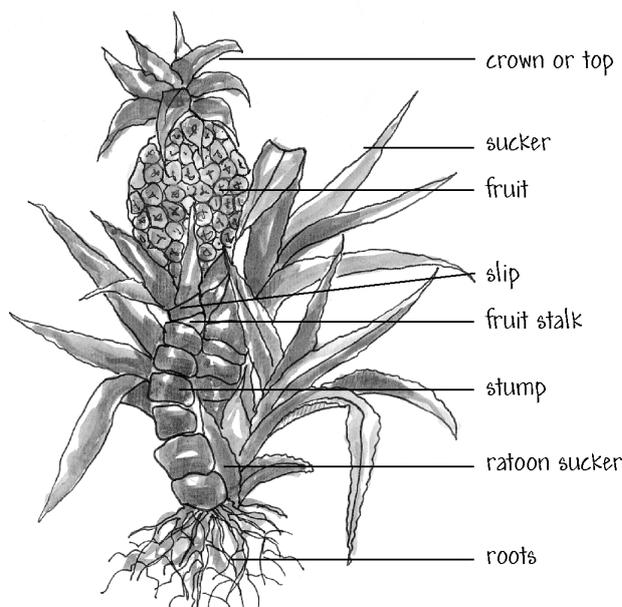
## Pineapples

**Where:** Hot places. They are not killed by drought, but are easily killed by frost.

**Soil:** Any well-drained soil.

**Planting:** You must cut off a part of a pineapple plant and plant it. You can use the branches on the sides of the stem (slips), or the new stems that grow from the ground (suckers). Slips must be longer than 30cm, and suckers longer than 60cm. Leave the suckers upside down in the sun for two weeks to dry before planting.

**Harvesting:** When half the skin has turned yellow, approximately twenty months after planting. Twelve months later the plant produces a second crop, usually not as good as the first. After this crop the plant should be removed.



## Plums

**Where:** Mostly in Central province of Kenya.

**When to plant:** During the cold rain season.

**Soil:** Well-drained.

**Pruning:** Prune in years one and two to form the shape of the tree. Thereafter pruning is not required.

**Harvesting:** It can be picked before it is ripe and it will ripen in a dark place.

## Strawberries

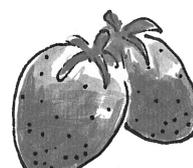
**Where:** Can grow in a wide range of climatic conditions.

**When to plant:** In late long rain season to the beginning of short rain season.

**Planting:**

- Strawberry plants can be used to make a border for your vegetable garden and also do very well in containers.
- The plants should be planted 30cm apart.
- Mulching is very important.
- Plants should be given less water when they start to bear fruit.
- Strawberry plants will produce good fruit for three to four years and should then be removed.

**Harvesting:** Wait until the fruit is fully ripe before harvesting.



## Fruit trees are susceptible to pests and diseases

Possible problems for specific fruits:

<b>Fruit</b>	<b>Possible problem</b>	<b>Cause</b>
Apricots	Brown spots with reddish margins on the leaves, yellow speckles on leaves with rusty spots on undersides, or white deposits on leaves	Various fungal diseases
	Worms in fruit, fruit goes rotten	Fruit fly
Berries	Holes in developing fruit	American bollworm
	Fruit eaten	Bugs, beetles or caterpillars
	Leaves lose colour, seem to dry out	Red spider mite
	Grey spots develop on canes, which then split	Fungal disease
Citrus	Leaves distorted and lumpy	Citrus psylla
	Leaves eaten	Caterpillar
Figs	Pieces taken out of ripening fruit	Birds
	Sawdust deposits under tree	Stem borer
Granadillas	Leaves stunted or dry with white waxy substance	Mealy bug
	Growth poor with hard or soft flecks on stems and leaves	Scale insects
Grapes	White or grey powdery deposits on shoots, flowers, fruit and leaves	Powdery mildew
	Ripening fruit goes soft and rotten with mouldy appearance	Grey mould
	Leaves develop oily-looking patches, turn yellow and dry out; white or brown deposits on undersides of the leaves; white powder on fruit	Downey mildew
	Fruit does not form properly; bunches become malformed and are very small	Snout beetle, bollworm and fruit beetle
	Leaves severely damaged with large holes or completely eaten	Moth caterpillar
	Holes in individual berries, which then go rotten	Birds
Guavas	Fruit has worms and go rotten	Fruit fly
Paw paws	White powdery deposits on young leaves, leaves turn brown, fruit also affected	Powdery mildew
	Young growth distorted and curly	Aphids



<b>Fruit</b>	<b>Possible problem</b>	<b>Cause</b>
Peaches and Nectarines	Fruit has worms and goes rotten	Fruit fly or coddling moth
	Leaves are distorted with lumpy pink blisters	Peach leaf curl
Strawberries	Fruit eaten	Birds or slugs and snails
	Fruit goes rotten, with grey fungus	Botrytis

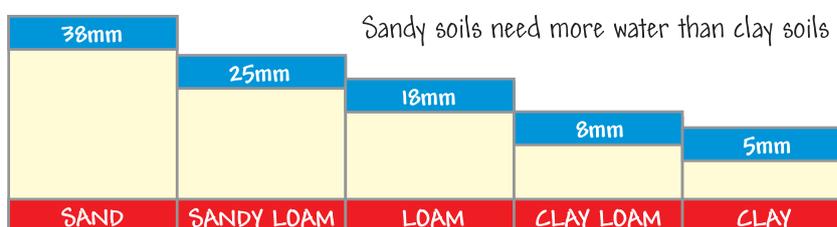


# Irrigation

Different types of soil need different amounts of water to sustain plant life. Sandy soil must be watered often, because the water drains away quickly. It is best to give clay soil a lot of water, but less often or else it becomes too wet. The best soil from an irrigation point of view is sandy loam, because it holds water but also drains well.

## How much water?

Clay soil holds water and plant foods. Such soil does not have to be watered often, but when it is watered, it must be watered well (ensure that the soil is wet down to below the plant roots). Sandy soil does not hold water well, so it must not be watered for too long, to avoid washing plant nutrients out of the soil. The following amounts of water are needed for the different kinds of soil:



## When to water?

The time to irrigate is when the soil is about seventy percent dry (half wet). Clay soil is half wet when the soil feels dry but can be made into a ball that breaks when you drop it.

It is best to water during cooler times of the day, like the early morning or late evening.

If your plants wilt, give them water as quickly as possible. This is not a very good indicator to use that your plants need water.

## Irrigation water

Irrigation water can come from rivers, streams, springs and boreholes. Unlike rainwater, borehole water is sometimes very salty. These salts can damage the soil so badly that few things will grow in it.

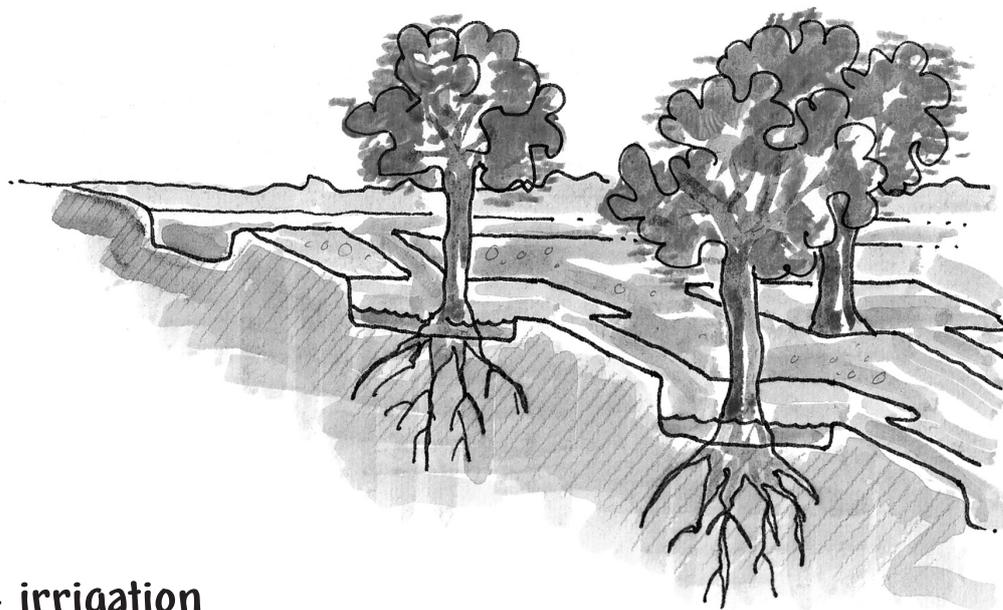
## Flood irrigation

Flood irrigation refers to using canals to lead water from a river or dam to fields, and most irrigation schemes use this method. If canals are very long, it is best to line them with concrete, but shorter unlined canals can work well, especially in clay soil. Lead the water from the canal into the field by using an outlet pipe or siphon tube.

Make sure that your field has a gentle and even slope. The field should be shorter than 200m if the soil is of a clay type, and shorter still if it is sandy. You will also need a drainage canal at the end of the land to lead excess water away. You should always measure how much water you are giving a field.

## Basin irrigation

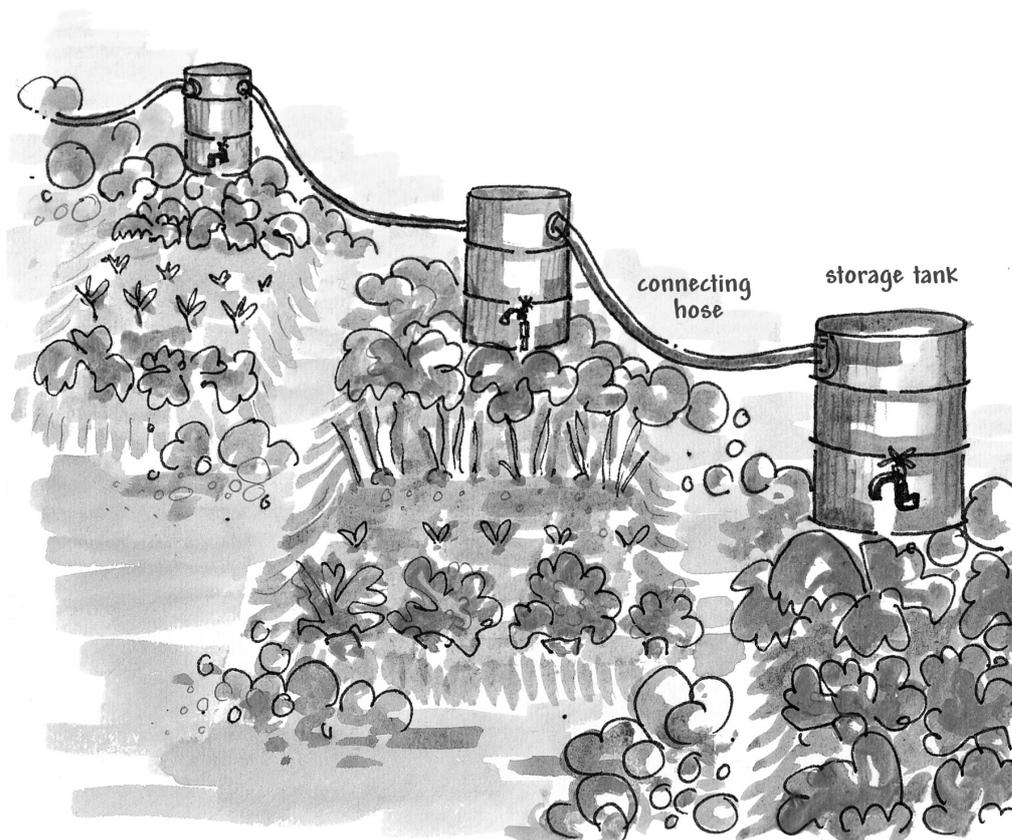
Basin irrigation is a good way of irrigating fruit trees. This means using small flat fields with low earth walls around them, and flooding the fields quickly.



## Pipe irrigation

This is the simplest and cheapest way of irrigating small fields, especially if you use a hosepipe and garden sprinkler.

If a group of people is sharing water, it is a good idea to use small storage tanks so that people can take water from the tanks to their plots by bucket or hosepipe. Oil drums of 200l make good tanks for this purpose. The water is pumped into a pipe that leads to all the drums. The number of drums depends on how much water is needed.

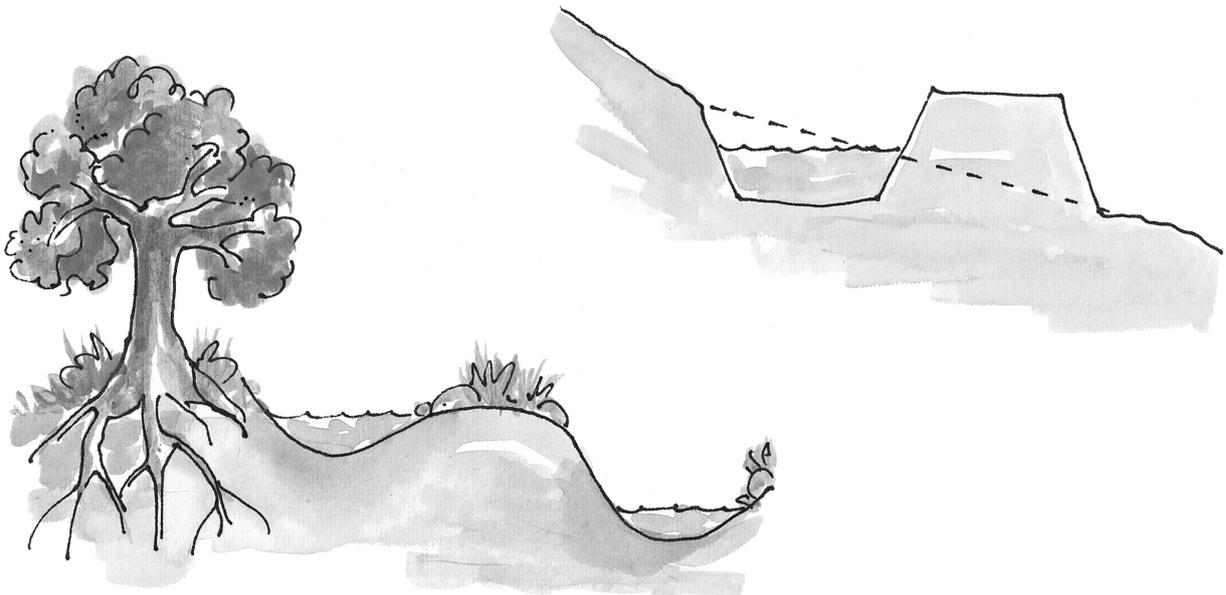


## Crops under irrigation

Vegetables and fruit trees grow well under irrigation. Crops need the most water when they are growing fast, flowering and beginning to form fruit. They do not need as much water when they are young or when they are ready for harvesting.

## Swales

You can build swales to slow down the flow of rain water and give it more time to sink into the ground. This improves the feeding of crops and raises the water table. A swale consists of a ditch and a wall of earth. A ditch is dug along a contour line and the soil from the ditch is used to build a low wall on the lower side of the ditch. Grasses, shrubs and trees are planted on the wall to stabilise the soil so that it does not wash away.



The increased amount of water that enters the soil at the swale as well as the nutrients collected in the ditch ensure that plants growing in the vicinity of the swale thrive. A swale requires only simple maintenance.



# Congratulations!

You have earned all three of the Food for Life badges.



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# Appendix A: Sowing table

## Coast Province

Vegetable	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Artichokes												
Asparagus												
Beans				X								
Beans, French												
Beetroot			X	X		X			X	X	X	
Broccoli			X	X	X			X				
Brussels sprouts												
Cabbages			X	X	X	X		X	X	X	X	
Cabbages, Chinese					X	X						
Carrots			X	X	X	X		X	X	X	X	
Cauliflower												
Celery			X	X	X	X					X	
Cow peas			X	X	X						X	X
Cucumbers			X									
Eggplants				X	X	X		X	X	X	X	
Kales			X	X	X	X		X	X	X	X	
Kohlrabi				X	X	X		X				
Leeks			X	X	X	X		X				
Lettuce			X	X	X	X		X	X	X	X	
Melons, sweet												
Onions					X	X		X				
Parsnips			X	X	X	X					X	
Peas												
Pigeon peas			X	X	X	X		X	X	X	X	
Peppers			X	X	X	X		X	X	X	X	
Potatoes												
Pumpkins			X									
Radishes	X	X		X	X	X		X	X	X		
Rhubarb												
Spinach			X	X	X	X					X	
Squashes			X								X	
Sweetcorn			X								X	
Sweet potatoes			X									
Swiss chard			X	X	X	X		X	X	X	X	
Tomatoes											X	
Turnips			X	X	X						X	
Vegetable	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

## Eastern Province

Vegetable	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Artichokes			X	X						X	X	
Asparagus		X	X									
Beans			X								X	X
Beans, French			X	X						X	X	X
Beetroot			X	X						X	X	X
Broccoli			X	X								
Brussels sprouts			X									
Cabbages			X	X						X	X	X
Cabbages, Chinese												
Carrots			X	X						X	X	X
Cauliflower			X	X								
Celery			X	X							X	X
Cow peas			X	X							X	X
Cucumbers			X									X
Eggplants										X	X	X
Kales			X	X						X	X	X
Kohlrabi												
Leeks			X									
Lettuce			X	X						X	X	X
Melons, sweet												X
Onions												
Parsnips			X	X							X	X
Peas											X	
Pigeon peas			X	X						X	X	X
Peppers			X	X						X	X	X
Potatoes			X	X						X	X	X
Pumpkins			X									X
Radishes				X	X			X	X			X
Rhubarb						X	X					
Spinach			X	X							X	X
Squashes			X								X	
Sweetcorn			X								X	X
Sweet potatoes			X									
Swiss chard			X	X				X	X	X	X	X
Tomatoes											X	X
Turnips			X	X							X	X
Vegetable	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

## North Eastern Province of Kenya & North Eastern & Northern Uganda

Vegetable	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Artichokes	X		X	X	X					X	X	X
Asparagus	X	X	X								X	
Beans	X		X								X	X
Beans, French	X		X	X	X						X	X
Beetroot	X		X	X	X					X	X	X
Broccoli			X	X	X							
Brussels sprouts			X		X							
Cabbages	X		X	X	X					X	X	X
Cabbages, Chinese					X							
Carrots	X		X	X	X					X	X	X
Cauliflower	X		X	X	X							
Celery	X		X	X	X							
Cow peas	X		X	X	X							
Cucumbers	X		X									X
Eggplants	X				X						X	X
Kales	X		X	X	X						X	X
Kohlrabi					X							
Leeks			X		X					X		
Lettuce	X		X	X	X					X	X	X
Melons, sweet	X											X
Onions					X							
Parsnips	X		X	X	X						X	X
Peas										X	X	
Pigeon peas	X		X	X	X						X	X
Peppers	X		X	X	X						X	X
Potatoes	X		X	X	X					X	X	X
Pumpkins	X		X									
Radishes	X			X	X	X		X	X	X		X
Rhubarb	X					X	X				X	
Spinach			X	X	X							
Squashes			X									
Sweetcorn			X									
Sweet potatoes			X									
Swiss chard			X	X	X			X	X			
Tomatoes											X	X
Turnips			X	X	X						X	X
Vegetable	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec



## Central Kenya & Southern, central & western parts of Uganda, Burundi

Vegetable	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Artichokes	X		X	X	X					X	X	X
Asparagus	X	X	X								X	
Beans	X		X								X	X
Beans, French	X		X	X	X					X	X	X
Beetroot	X		X	X	X					X	X	X
Broccoli			X	X	X							
Brussels sprouts			X	X	X							
Cabbages	X		X	X	X					X	X	X
Cabbages, Chinese					X							
Carrots	X		X	X	X					X	X	X
Cauliflower	X		X	X	X							
Celery	X		X	X	X						X	X
Cow peas	X		X	X	X					X	X	X
Cucumbers	X		X									X
Eggplants	X			X	X					X	X	X
Kales	X		X	X	X					X	X	X
Kohlrabi				X	X							
Leeks				X	X							
Lettuce	X		X	X	X					X	X	X
Melons, sweet	X											X
Onions					X							
Parsnips	X		X	X	X						X	X
Peas										X	X	
Peppers	X		X	X	X					X	X	X
Pigeon peas	X		X	X	X					X	X	X
Potatoes	X		X	X	X					X	X	X
Pumpkins	X		X									X
Radishes	X	X		X	X	X		X	X	X		X
Rhubarb	X					X	X				X	
Spinach	X		X	X	X						X	X
Squashes	X		X								X	X
Sweetcorn	X		X								X	X
Sweet potatoes	X		X									
Swiss chard	X		X	X	X			X	X	X	X	X
Tomatoes	X										X	X
Turnips			X	X	X						X	X
<b>Vegetable</b>	<b>Jan</b>	<b>Feb</b>	<b>Mar</b>	<b>Apr</b>	<b>May</b>	<b>Jun</b>	<b>Jul</b>	<b>Aug</b>	<b>Sep</b>	<b>Oct</b>	<b>Nov</b>	<b>Dec</b>



## Rift Valley

Vegetable	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Artichokes			X	X	X					X	X	X
Asparagus		X	X								X	X
Beans			X						X			
Beans, French			X	X	X							
Beetroot			X	X	X	X	X					
Broccoli			X	X	X				X			
Brussels sprouts			X	X	X	X						
Cabbages			X	X	X	X	X	X	X			
Cabbages, Chinese					X	X						
Carrots			X	X	X	X	X	X	X			
Cauliflower			X	X	X	X						
Celery			X	X	X	X	X					
Cow peas			X	X	X	X	X	X	X			
Cucumbers			X									
Eggplants				X	X	X	X	X	X			
Kales			X	X	X	X	X	X	X			
Kohlrabi				X	X	X	X	X				
Leeks				X	X	X	X	X				
Lettuce			X	X	X	X	X	X	X			
Melons, sweet												
Onions					X	X	X	X				
Parsnips			X	X	X	X						
Peas						X	X	X	X			
Pigeon peas												
Peppers			X	X	X	X	X	X	X			
Potatoes			X	X	X	X	X	X	X			
Pumpkins			X									
Radishes	X	X		X	X	X	X	X	X	X	X	
Rhubarb						X	X				X	X
Spinach			X	X	X	X	X					
Squashes			X									
Sweetcorn			X									
Sweet potatoes			X									
Swiss chard			X	X	X	X	X	X	X			
Tomatoes												
Turnips			X	X	X	X						
Vegetable	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec



## Western

Vegetable	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Artichokes			X	X	X					X	X	X
Asparagus		X	X								X	
Beans			X								X	X
Beans, French			X	X	X					X	X	X
Beetroot			X	X	X					X	X	X
Broccoli			X	X	X							
Brussels sprouts			X	X	X							
Cabbages			X	X	X					X	X	X
Cabbages, Chinese					X							
Carrots			X	X	X					X	X	X
Cauliflower			X	X	X							
Celery			X	X	X						X	X
Cow peas			X	X	X					X	X	X
Cucumbers			X									X
Eggplants				X	X					X	X	X
Kales			X	X	X					X	X	X
Kohlrabi				X	X							
Leeks				X	X							
Lettuce			X	X	X					X	X	X
Melons, sweet												X
Onions					X							
Parsnips			X	X	X						X	X
Peas											X	
Peppers			X	X	X					X	X	X
Pigeon peas			X	X	X					X	X	X
Potatoes			X	X	X					X	X	X
Pumpkins			X									X
Radishes	X	X		X	X	X		X	X	X		X
Rhubarb						X	X				X	
Spinach			X	X	X						X	X
Squashes			X								X	X
Sweetcorn			X								X	X
Sweet potatoes			X									
Swiss chard			X	X	X			X	X	X	X	X
Tomatoes											X	X
Turnips			X	X	X						X	X
Vegetable	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec



## Nyanza

Vegetable	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Artichokes			X	X	X					X	X	X
Asparagus		X	X								X	
Beans			X								X	X
Beans, French			X	X	X					X	X	X
Beetroot			X	X	X					X	X	X
Broccoli			X	X	X							
Brussels sprouts			X	X	X							
Cabbages			X	X	X					X	X	X
Cabbages, Chinese												
Carrots			X	X	X					X	X	X
Cauliflower			X	X	X							
Celery			X	X	X						X	
Cow peas			X	X	X					X	X	X
Cucumbers			X									X
Eggplants				X	X					X	X	X
Kales			X	X	X					X	X	X
Kohlrabi				X	X							
Leeks				X	X							
Lettuce			X	X	X					X	X	X
Melons, sweet												X
Onions					X							
Parsnips			X	X	X						X	X
Peas											X	
Peppers			X	X	X					X	X	X
Pigeon peas			X	X	X					X	X	X
Potatoes			X	X	X					X	X	X
Pumpkins			X									X
Radishes	X	X		X	X	X		X	X	X		X
Rhubarb						X	X				X	
Spinach			X	X	X						X	
Squashes			X								X	X
Sweetcorn			X								X	X
Sweet potatoes			X									
Swiss chard			X	X	X			X	X	X	X	
Tomatoes											X	X
Turnips			X	X	X						X	X
Vegetable	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec



## Nairobi

Vegetable	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Artichokes	X		X	X	X					X	X	X
Asparagus	X	X	X								X	
Beans	X										X	X
Beans, French	X		X	X	X					X	X	X
Beetroot	X		X	X	X					X	X	X
Broccoli			X	X	X							
Brussels sprouts			X	X	X							
Cabbages	X		X	X	X					X	X	X
Cabbages, Chinese					X							
Carrots	X		X	X	X					X	X	X
Cauliflower	X		X	X	X							
Celery	X		X	X	X						X	X
Cow peas	X		X	X	X					X	X	X
Cucumbers	X		X									X
Eggplants				X	X					X	X	X
Kales	X		X	X	X					X	X	X
Kohlrabi				X	X							
Leeks				X	X							
Lettuce	X		X	X	X					X	X	X
Melons, sweet	X											X
Onions					X							
Parsnips	X		X	X	X						X	X
Peas										X	X	
Peppers			X	X	X					X	X	X
Pigeon peas			X	X	X					X	X	X
Potatoes	X		X	X	X					X	X	X
Pumpkins	X		X									X
Radishes	X	X		X	X	X		X	X	X		X
Rhubarb	X					X	X				X	
Spinach	X		X	X	X						X	X
Squashes	X		X								X	X
Sweetcorn	X		X								X	X
Sweet potatoes	X		X									
Swiss chard	X		X	X	X			X	X	X	X	X
Tomatoes	X										X	X
Turnips			X	X	X						X	X
<b>Vegetable</b>	<b>Jan</b>	<b>Feb</b>	<b>Mar</b>	<b>Apr</b>	<b>May</b>	<b>Jun</b>	<b>Jul</b>	<b>Aug</b>	<b>Sep</b>	<b>Oct</b>	<b>Nov</b>	<b>Dec</b>



# Appendix B

Possible problems for specific vegetables:

<b>Vegetable</b>	<b>Possible problem</b>	<b>Cause</b>
<b>Beans</b>	Young plants wilt and die	Cutworms
	Young shoots and leaves distorted – small insects on stems and leaves	Aphids
	Shoots and tips wilt and die – green bugs on plant	Green shield bug
	plants wither and die	Leaves go black or brown and Fungal disease
<b>Beetroot</b>	Young plants wilt and die	Cutworms
	Black-brown spots form on leaf	Leaf spot fungal disease
<b>Broccoli</b>	Leaves crumpled and distorted	Aphids
	Holes in leaves	Caterpillars
<b>Cabbage</b>	Holes on the leaves, right through into the hearts	Caterpillars or slugs and snails
	Discolouration of the leaves, stunted growth, stems go black and rot off	Fungal diseases
<b>Carrots</b>	Roots develop green shoulder	Exposure to the sun
	Roots are split or deformed	Overly rich soil
	Plants make plenty of top growth but roots small and underdeveloped	Overly rich soil
<b>Cauliflower</b>	Leaves curled and distorted	Aphids
	Holes in leaves and head eaten	Caterpillars
	Heads discoloured	Sunburn and lack of water
	Leaves distorted and narrow with blisters on leaf margin	Whip-tail disease
<b>Lettuce</b>	Seedlings fall over and wilt	Cutworm
	Leaves become distorted, small insects on underside	Aphids
	Heads are slimy and rotten when picked	Bottom rot



<b>Vegetable</b>	<b>Possible problem</b>	<b>Cause</b>
	Plants go to seed before making heads	Incorrect cultivars for the season and poor soil preparation
<b>Peas</b>	White deposits on leaves Seeds fail to germinate Pods damaged Holes in pods Holes in leaves Leaves discolour and fall off	Powdery mildew Birds which eat seed Birds American bollworm Snails and slugs Red spider mite
<b>Spinach</b>	Holes in leaves Brown marks on leaves, which then turn grey and rot	Caterpillars or slugs and snails Leaf spot fungal diseases
<b>Tomatoes</b>	Leaves distorted and yellow; plenty of small white flying insects on undersides Fruit has holes in it with a green worm in the fruit Leaves go yellowish, turn brown and drop off Leaves develop brown or black spots with target-like rings and the fruit is damaged Leaves become blotchy and brown, then black with discoloured fruit Fruit malformed or misshapen Fruit goes black and rots at the top	White fly American bollworm or pulsia looper caterpillar Red spider mite Early blight or target spot Late blight Because of sudden cold weather, incorrect fertilisation or overhead irrigation Incorrect or irregular watering
<b>Turnips</b>	Young leaves distorted and small insects noticeable Leaves eaten	Aphids Caterpillars, especially of the white cabbage moth