

BMW SEED PROGRAMME

DOMESTIC VEGETABLE GARDENING

BMW SEED PROGRAMME GRATEFULLY ACKNOWLEDGES THE LAND BANK FOR THE PROVISION OF SOURCE MATERIAL FOR THIS MANUAL

PLANNING VEGETABLE PRODUCTION.....	3
WHERE TO MAKE YOUR VEGETABLE GARDEN	3
THE SIZE OF THE GARDEN	4
EQUIPMENT	4
THE NURSERY	4
PREPARING SEEDBEDS	5
SOIL	6
SOIL COMPOSITION	6
SOIL TYPE.....	6
<i>Sandy Soil</i>	6
<i>Clayey Soil</i>	7
<i>Loamy soils</i>	7
SOIL EROSION	7
WHAT IS SOIL EROSION?	8
CAUSES OF EROSION	8
MANURE & OTHER ORGANIC FERTILIZERS	8
LIQUID MANURE	9
ORGANIC FERTILIZER	9
MAKING ORGANIC FERTILIZER.....	9
COMPOST.....	10
<i>WHY IS IT NECESSARY TO USE COMPOST?</i>	10
<i>WHAT TO USE IN MAKING COMPOST</i>	10
<i>GARDEN MATERIAL</i>	10
<i>KITCHEN WASTE</i>	10
<i>GENERAL</i>	11
<i>MATERIALS WHICH YOU SHOULD NOT ADD TO A COMPOST HEAP</i>	11
<i>WHERE TO MAKE A COMPOST HEAP</i>	11
<i>BUILDING A COMPOST HEAP</i>	11
MULCH.....	13
WHY DO WE USE MULCH?	14
STONE MULCHING	14
<i>NOTE WELL</i>	15
SOWING SEED AND PLANTING SEEDLINGS	15
PREPARING THE SEEDBEDS.....	15
SOWING THE SEED	16
FOOD-GARDENING IN CONTAINERS	17

CONTAINER CHOICE.....	18
SOIL AND DRAINAGE	18
WHICH VEGETABLES TO CHOOSE.....	19
CONTAINER CANDIDATES	20
CONTAINER CARE.....	20
REPLANTING CONTAINERS	21
<i>POTTING SOIL RECIPE</i>	21
TYRE GARDENS	22
CUTTING THE TYRES.....	22
LAYING THE TYRE GARDENS	23
PLANTING VEGETABLES IN THE TYRES.....	24
POTATOS IN CONTAINERS	25
GENERAL TIPS	26
SUCCESSION PLANTING	26
COMPANION PLANTING	26
BRICK BEDS	27
SEED-SOWING GUIDE	28
COMPANION PLANTING TABLE	32
PEST CONTROL WITHOUT POISONS.....	33
RULES FOR NON-POISONOUS PEST CONTROL	33
ENVIRONMENT-FRIENDLY INSECT REPELLENTS	34
SOME COMMON PESTS AND HOW TO DEAL WITH THEM	34

PLANNING VEGETABLE PRODUCTION

Producing vegetables is a farming activity or business which needs to be planned well.

A business involves finances such as:

- Buying
- Selling
- Management of funds

It is essential to plan your vegetable production in order to know which crop to plant and to know which actions to perform at specific times.

Remember to rotate your crops. Never plant the same or closely related crops on the same soil during the next planting season. Crop rotation prevents poor soil, pests and diseases.

The following factors must be kept in mind when planning your vegetable garden:

Where to make your garden

The size of the garden

Equipment

The nursery

Preparing the seedbeds

WHERE TO MAKE YOUR VEGETABLE GARDEN

Choose the best spot for your vegetable garden otherwise your vegetables may not grow well. It must:

- be near your house so that you can take good care of it;
- be near water;
- have good soil;
- be level so that the water will drain well;
- (If you plant on sloping terrain, build a number of terraces. Before building the terraces, put the topsoil aside. Build the terraces with the subsoil and then spread the topsoil evenly.)
- be sunny; (If there is some shade for a few hours, rather plant leafy crops.)
- and be sheltered from the wind, frost and animals. (If necessary, a wall hedge or fence can provide protection.)

THE SIZE OF THE GARDEN

When deciding how big to make the garden, take into account:

- How big your family is.
- How much water you have available in the dry season.
- What vegetables you wish to grow. Pumpkins, for example, can only be grown in a large garden.
- How much time you have to look after the garden.

EQUIPMENT

Only a few tools are necessary:

Panga	To clear away grass and bushes.
Spade	To dig with.
Fork	To turn over the soil or to lift out potatoes. A fork also makes working in clayey and stony soil easier.
Hoe	To work soil up to the plants and to remove weeds.
Rake	To create an even surface in the seedbed and to rake soil over the seeds after they have been sown.
Watering can	To water the vegetables.
Wheelbarrow	For carrying soil, compost, stones, etc.
String or line	To make straight beds.

THE NURSERY

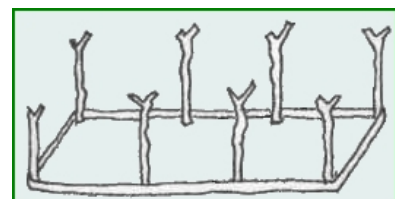
You need a shelter or nursery in your garden to protect seedlings against harsh sunlight and rainstorms. Some plants, such as tomatoes, lettuce and carrots, are sown in the nursery, and when the plants are big and strong enough they are transplanted into larger beds outside.

You can buy poles and shade netting or simply do the following:

For the shelter, get 4 or more strong poles with forked ends. The poles must be waist height when you have planted them.



Plant the poles at the corners and, if necessary, along the edges of the bed.



Put reeds or sticks across the poles and cover with grass or reeds. Allow some sun (about 50%) to filter through the grass roof. Remove some of the grass or reeds when the plants are bigger so that the plants can become used to more sun and harsher conditions. It is best to make removable roofs which you can use wherever and whenever you need them.



You can also use shade netting to cover the nursery.



PREPARING SEEDBEDS

Make the bed as long as necessary. A bed should not be wider than 1 pace so that you will be able to stand next to it when working.



Stretch string or rope around the beds to make them straight.



In dry seasons the beds can be on the same level as the paths, but in wet months they can be higher. If you have problems with nematodes or cutworms, prepare the bed a month before planting time and clear away all plant material.

- Dig up and turn the soil in the beds to spade depth.
- Break up the large clods.
- Level the soil with a rake.
- Leave pathways (about 4 hand-widths) between the beds so that you can walk on dry soil between the beds. \ Spread compost (1 wheelbarrow load

for a square of 1 pace by 2 paces) over the bed. If you use manure, use less as it may burn the plants. Work the compost into the soil and rake the bed so that it is even. You can now sow the seed or transplant the seedlings.

SOIL

Soil is a vital resource for growing crops. Although vegetables can grow in almost any kind of soil, they will grow more easily in some soil types than in others.

For successful vegetable production year after year the soil should:

- be able to hold the plants;
- be able to hold sufficient water;
- provide a good medium for roots to grow in;
- let enough air through; and
- be free of root diseases.

It is important to treat the soil to improve or maintain these characteristics.

SOIL COMPOSITION

Soil is made up of organic and inorganic matter.

The organic matter is the rotting particles (small bits) of plants and animals.

The inorganic matter is particles of weathered rock and minerals.

The spaces between the small particles that make up the soil are filled with air or water.

Plants such as algae and lichen, and animals such as earthworms, moles and termites live in the soil. They improve the movement of air (aeration) and remove water from the soil (drainage).

Some organisms in the soil, such as bacteria, break down organic matter and other compounds into plant food (nutrients) which can be easily absorbed and used by plants.

SOIL TYPE

Soils are classified into three main types, namely sandy, clayey and loamy soils.

Sandy Soil

Sandy soils feel gritty, are not sticky when wet and remain loose when dry.

Advantages

During moist periods roots can grow quickly. Sandy soils are easy to cultivate.

Disadvantages

They dry out fast, lose nutrients quickly in case of too much rain or irrigation and are eroded easily by wind.

How to improve sandy soil

Add manure and compost as surface mulches if these materials are available, because they will help to conserve nutrients and water and will reduce erosion. Sandy soils absorb water quickly, but dry out very soon.

Clayey Soil

Clayey soils feel sticky when wet and form large, hard clods when dry.

Advantages

Clayey soils hold nutrients and water well.

Disadvantages

They need large quantities of water once dry; are difficult to cultivate and become waterlogged in case of too much rain or irrigation; can form a hard surface crust on drying, which restricts seedlings emergence; and restrict root growth.

How to improve clayey soil

Try not to cultivate when wet. Add compost or manure if available to help soften up clay. Surface mulches will reduce crusting and promote seedling emergence.

Clayey soils take a long time to absorb water but retain moisture for a long period.

Loamy soils

Loamy soils are sticky but cannot be squeezed into a ball.

Advantages

These soils are better than sandy or clayey soils. A loamy soil contains characteristics of both sandy and clayey soil types.

2.3 SOIL STRUCTURE

Structure indicates the natural cohesion of soil particles when forming larger pieces.

SOIL EROSION

The soil covering the surface of the earth has taken millions of years to form and we must learn to respect it. Soil is formed at a rate of only 1cm every 100 to 400 years and it takes between 3 000 and 12 000 years to build enough soil to form productive land. This means that soil is a non-renewable resource and once destroyed it is gone forever.

If we disregard this, a time will come when there would not be enough soil left to sustain life on earth, because the soil is a necessary growth medium for plants, a home for certain insects and animals, as well as a medium from which we get minerals, such as gold. It is important therefore to treat soil, especially topsoil, as a living entity.

WHAT IS SOIL EROSION?

Soil erosion occurs when soil is removed through the action of wind or water at a greater rate than it is formed.

When a raindrop hits soil that is not protected by a cover of vegetation and where there are no roots to bind the soil, it has the impact of a bullet.

Soil particles are loosened, washed down the slope of the land, and either end up in the valley or are washed away out to sea by streams and rivers.

Erosion removes the topsoil first. Once this nutrient-rich layer is gone, few plants will grow in the soil again.

Without soil and plants the land becomes like a desert - unable to support life.

CAUSES OF EROSION

Erosion occurs when farming practices are not compatible with the fact that soil can be washed or blown away.

Examples of such practices are:

Overstocking and overgrazing.

Lack of crop rotation and planting down the contour instead of along it.

MANURE & OTHER ORGANIC FERTILIZERS

Animal manure and other organic fertilizers can be used to keep the soil fertile or to make it more fertile. They contain all the food (nutrients) plants need.

Animal manure can be used to keep the soil fertile or to make it more fertile. It contains all the food (nutrients) plants need, namely nitrogen, phosphorus, potassium and most trace elements.

Poultry manure is the best. As poultry manure contains much nitrogen, it must be used carefully. Apply sparsely (150-200 g/sq. m) and dig in well before planting the crop. Do not use poultry manure when you are planting a root crop.

Sheep, horse or cattle manure is second best.

Lastly there is pig manure.

How the manure is handled before it is used.

If manure is not handled correctly, it may lose its value.

Rain on unprotected manure washes out many of the nutrients.

Manure should be covered or worked into the soil as soon as possible.

LIQUID MANURE

Liquid manure is usually applied to the plants while they are growing, in other words as topdressing. It is easy to prepare and good for most vegetables.

Prepare it as follows:

1. Put a bucket of manure in a hessian sack.
2. Hang the sack in a drum of water. Part of the manure will dissolve in the water.
3. After 2 weeks fill a bucket or watering can a quarter full with the dissolved manure and fill up with water.
4. A watering can full of liquid is enough for 1 square metre (1 pace long by 1 pace wide). A bed which is 1 pace wide and 10 paces long therefore needs 10 watering cans of liquid manure.

ORGANIC FERTILIZER

MAKING ORGANIC FERTILIZER

Organic fertilizer keeps the soil productive. It provides all the nutrients a crop needs to produce a good yield and it costs nothing.

- 1 Collect all types of organic waste (manure & garden waste).
- 2 Throw manure and garden waste on a heap, mix well and water.
- 3 Turn every 3 to 4 weeks.



After 3 months the manure should be ready for use on your crops.

BLOODMEAL AND BONEMEAL

Bloodmeal and bonemeal are suitable for use in addition to other fertilizers. Bonemeal works relatively slowly but has a long-lasting effect. It is a good idea to add a few bones and some blood to your compost heap. If an animal is slaughtered, its blood can be collected, dried and added to the compost heap.

COMPOST

There is seldom enough animal manure available to keep the soil fertile. It is therefore necessary to make compost.

WHAT IS COMPOST?

In nature, compost is a mixture of decomposed plant and animal material. Decomposition means that plant and animal remains are broken down into smaller parts.

Organisms such as bacteria, fungi, earthworms, snails, insects and birds help to decompose the material and turn it into humus. Humus is the form of food which the plant can use.

WHY IS IT NECESSARY TO USE COMPOST?

When we make compost in our gardens we are really doing what nature does to ensure that our plants will grow well. Using compost is important because it returns nutrients to the soil, helps the soil to hold water and air, binds the soil and so prevents erosion and produces healthy crops with few diseases.

WHAT TO USE IN MAKING COMPOST

About half of the refuse we throw away each day can be turned into compost. Most healthy materials of plant or animal origin that rot easily can be used.

GARDEN MATERIAL

Grass cuttings, soft garden trimmings, leaves, flowers and vegetable remains. Chop up the stalks of sweetcorn, cabbage, broccoli and Brussels sprouts so that they will decompose faster. Weeds are especially suitable. Their long roots absorb many nutrients from the soil and these nutrients will be released in the compost. The weeds should be pulled up before they develop any seeds.

KITCHEN WASTE

Vegetable peelings and leaves, fruit peels and cores, cooked table scraps, tea leaves and bags, egg shells and stale bread.

GENERAL

Paper and cardboard, sawdust (only small quantities) and woodshavings, animal manure, woodfire ash and seaweed.

MATERIALS WHICH YOU SHOULD NOT ADD TO A COMPOST HEAP

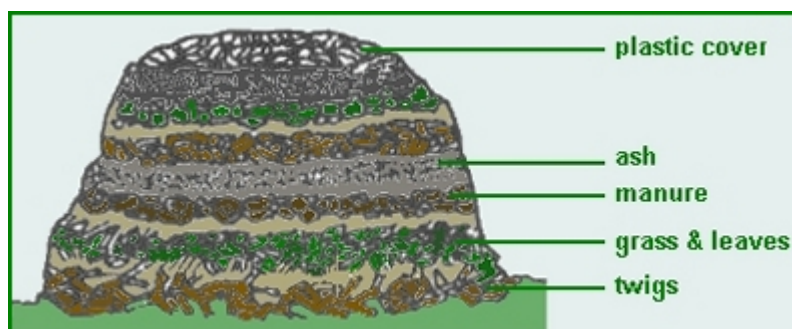
Kikuyu grass, woody garden clippings, pine needles, rose and other cuttings with thorns. Seeds, bulbs or garden waste sprayed with pesticides. Toilet waste or septic tank sludge, diseased animal carcasses and diseased plants. Anything that does not decompose, such as metals, glass and plastic.

WHERE TO MAKE A COMPOST HEAP

Make the compost heap under a leafy tree or next to a tall hedge. This will prevent the sun and wind from drying out the outer layer of the heap. Do not make the heap in a hollow where rainwater could gather for a number of days.

BUILDING A COMPOST HEAP

A good size for the compost heap is 2 paces by 2 paces (2m x 2m) The heap should be roughly twice as big at the bottom as at the top. Start by leveling the spot. Mix all the material well - all big pieces should be chopped up. Do not add layers of only one material.



Step 1

THE BASE

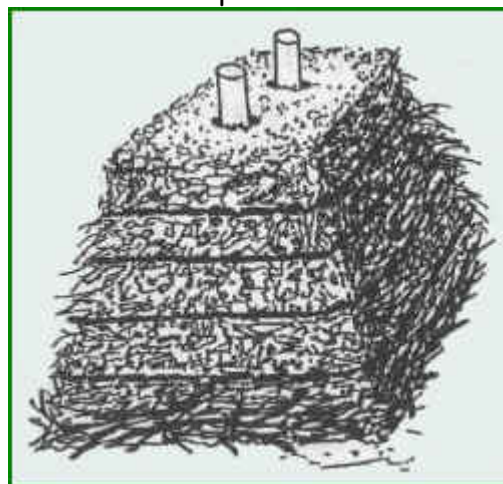
As the micro-organisms in the heap need air to work, the base is built to improve aeration. Use coarse material such as twigs, mealie cobs, bricks, tins, etc. for the base. This layer must be about 2 hand-widths (20cm) deep.

First layer	Spread a layer of plant material about 2 hand-widths deep on the rough base.
Second layer	If you have kraal or chicken manure, mature compost or bonemeal, spread a layer about 1 hand-width (10cm) deep on top of the first layer. The manure, compost or bonemeal speeds up decomposition.
Third layer	Next add a thin layer of soil and ash (3 fingers or 3cm deep). The organisms in the soil, earthworms in particular, will help the rotting process, mix the material and increase air flow. Repeat the first three layers until the heap is as high as you want it. Moisten each layer as you build.
Top layer	Stop with a layer of soil, dry grass, leaves or sawdust. This will keep smells in and will not attract flies.

Step 2

STICKS

Take 2 sticks of about 2 paces (2m) long and push them into the heap. The sticks can be taken out later to test the heat and moisture of the compost. They also help to aerate the compost.



Step 3

COVER

Cover the heap with straw, soil, old sacks or plastic. This keeps in moisture and heat. Heat helps decompose plant and animal material and destroys weeds.

WATERING THE HEAP

Take out the sticks regularly and test the moisture. Add water, if necessary. Do not allow it to dry out or to become too wet.



Step 5

TURNING THE HEAP

After about 3 weeks, turn the compost so that the outside layer goes inside and the other way around. Turning the heap speeds up decomposition. If any of the material is dry, moisten it. Take out the stick regularly and test the heat. If the heap has cooled down, it should be turned. Turn again after another 3 weeks or even every week. The more the heap is turned, the sooner the compost will be ready. After about 10 weeks the compost should be ready for use.

HOW TO KNOW WHEN THE COMPOST HEAP IS READY

Compost is ready to use when it is crumbly, dark and has the good smell of clean earth. It can now be dug into the garden soil.

HAVING A CONSTANT SUPPLY OF COMPOST

Do not keep on adding material to the same heap. Keep two or three compost heaps going at the same time. Start the second heap 3 weeks after the first and the third 3 weeks after the second. This will ensure that you always have compost when you need it.

MULCH

MULCH is a protective covering that is put on top of the vegetable or seedling beds to protect it, very much like a blanket.

There are a variety of materials that can be used for mulching, these include:

Dry leaves, they make good mulch and are freely available. Ensure that they are dry and crush them into small pieces before use.

Lawn trimmings. Collect the grass after mowing the lawn, spread it, turning it regularly and allow it to dry completely, it is then ready for use. One can mix it with other material as well. The layer that is put in the beds should only be about 2.5 cm thick.

Dry veld grass, again, make sure the material is properly dried before use.

The best mulch however, is compost.

WHY DO WE USE MULCH?

Mulch insulates the earth from the heat of the sun, and in doing so, saves water.

Mulch also helps to control weeds.

Mulch protects plants from heat, cold and winds.

As it rots, it gradually improves the quality of the soil, so all-in-all it is a very good practice to use mulch.

Mulch helps sandy soil to hold water and improves the drainage of clay soil.

No digging is necessary when you keep on using mulch. Mulch attracts earthworms, so they do the digging.

Mulch prevents soil erosion during heavy rains or watering.

Mulch helps low-growing vegetables: Pumpkins, squashes, cucumbers, unslaked tomatoes, strawberries and other vegetables which run on the ground are kept clean and healthy when they grow on mulch. They are not spoilt by splashing, wet soil, or worms.

Mulches should always be dry - never fresh and green.

STONE MULCHING

Stone mulching can be used where leaves, grass, paper etc. are hard to find. Place small stones between the rows of plants.

* Stones keep the soil moist;

- * Stones catch the heat of the sun and keep the soil warm - very useful in winter;
- * Spaces between the stones can be filled with compost or good soil, and spaces between the plants can be mulched in the ordinary way;
- * Stone mulching is very good in hot, dry areas; it is used successfully in desert conditions.

NOTE WELL

Where there is poor drainage after long, heavy rains, it may be necessary to remove mulch until the soil is warm and dry again.

Germinating seeds and small seedlings need sun-warmed soil. Therefore keep mulch away from them until they are well established.

Mulch should not actually touch the trunks of trees nor the stems of plants nor cover the base of perennials.

In areas where there are termites (white ants) they will carry the mulch off the bed, especially if it is dry material. Soaking the mulch in a solution of 5 teaspoons (25ml) of Jeyes Fluid to 5 litres of water before putting it on the vegetable bed often protects it from termites. As the mulch dries, re-wet it with a sprinkling of the Jeyes Fluid water.

Replace mulch regularly as it decomposes or is blown away.

SOWING SEED AND PLANTING SEEDLINGS

PREPARING THE SEEDBEDS

Sow the seed in straight rows in the bed or in boxes. Stretch a rope or use a plank to form straight rows.



Make the rows one hand-width apart.



SOWING THE SEED

There are three ways in which seed can be sown directly into the bed:

1. PLANT THE SEEDS ONE BY ONE

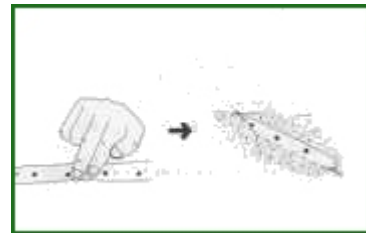
Plant big seeds, such as those of pumpkins, cucumbers and sweet melons, far from one another (2 hand-widths). These plants are runners and need lots of space. Make a separate hole for each seed.

Plant the seeds 5 times deeper than their size, all of them at exactly the same depth. In sandy soil plant them a little deeper so that they do not dry out. In clayey soil plant them a little closer to the surface.

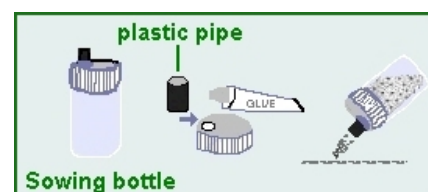
2. PLANT THE SEEDS IN FURROWS

Plant smaller seeds, such as those of beetroot, spinach or maize, closer to one another.

Make a furrow in the soil and sow the seeds in the furrow.



Use a sowing bottle to sow very small seed thickly and shallowly.



3. SCATTER THE SEED

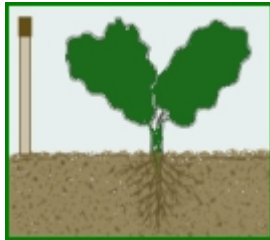
Scatter very small seeds, such as those of carrots and lettuce, evenly over very fine soil. Cover them with a thin layer of soil.



After sowing the seed, water the bed immediately with a watering can. Keep the soil moist until the shoots appear.



Thin out the plants when they have reached the height of a match. The plants should be 3cm (about 2 fingers) apart in the row.



SEEDLINGS IN TRAYS

Seedlings grown in seed-boxes can withstand transport better. Transplanting is more successful because the seed-box medium is less subject to crumbling.

4.2 PLANTING SEEDLINGS

1. Buy seedlings or grow them yourself. Water the plants well before transplanting them. If possible, choose a cloudy, cool day.
2. On warm, sunny days seedlings should be transplanted late in the afternoon so that they can recover overnight.
3. Make a hole in the soil deep enough so that the plant roots fit easily into it. Plant the seedling without damaging the roots.
4. Press the soil firmly but carefully down around the plant and cover the soil with a mulch such as straw, grass or leaves to keep it moist. Do not cover the plants.
5. Water the plants thoroughly after they have been planted.

FOOD-GARDENING IN CONTAINERS

It is not essential to have a garden in order to grow edible crops. As long as you have an area which gets about four to five hours of sun a day, whether it be on a verandah, balcony or paved courtyard, you will be able to grow a wide range of vegetables, as well as smaller growing fruit trees and creepers. Even if you do

have a garden, you might not have the right growing conditions (especially for vegetables), such as insufficient sun, poor soil or too much wind - growing the plants in containers will overcome these problems.

Growing plants in containers has a number of advantages. While you may not be able to produce a large quantity of fruit or vegetables at a time, the plants are often easier to care for and protect from insect attack than those in the open ground.

Filling the containers with the correct soil is less hard work than having to dig properly prepared beds and planting holes, especially for vegetables. It is also easier to ensure that each particular type has its own specific growing medium, for example, tomatoes need a very rich, well-composted and manured soil, but carrots like a light, very friable soil.

CONTAINER CHOICE

Almost any object that can hold soil but allows water to drain out can be used as a container. This ranges from plastic and metal tins, black plastic plant bags, old metal or rubber garbage bins, metal barrels, old baths, a stack of car tyres, to specially made plastic, cement and terracotta pots, containers, troughs and window boxes, as well as grow bags.

The size of the container you use will depend on the type of vegetable you wish to grow. Shallow root crops, such as lettuce, spring onions and many herbs, can be grown in pots or containers which are between 20-50 cm deep; long troughs, flower boxes and wide, square containers are an excellent choice. Plants with a deep root system as well as climbing types should be grown in large, deep containers.

SOIL AND DRAINAGE

To grow well in containers, plants must get enough of the essential plant nutrients. While the soil must hold water and not dry out too rapidly, it must not become waterlogged either. Plants grown in containers will not do well if there is poor drainage, so the soil itself must drain well and the containers must have proper drainage holes. Make sure that the containers have adequate drainage holes before you plant - trying to improve drainage once a container has been planted is extremely difficult. The individual holes should be about 1-2 cm wide and the number of holes will depend on the size of the container. A trough 90 cm long usually has eight drainage holes, while round or square pots may have one large hole in the centre or three to five holes spaced around the bottom. The drainage holes must be covered to stop the soil blocking the holes. Use broken brick, small stones, pebbles or stone chips, but do not use bits of concrete -

concrete has too much lime in it and the chemical leaches out onto the plants. It is a good idea to raise large containers a few centimetres off the ground by putting small pieces of flat stone under the containers to prevent weeds or debris from blocking the drainage holes.

Either buy ready-made potting soil for your containers or make your own. If you feel that a ready-made soil is not rich enough for a specific vegetable, add extra compost or old manure, while coarse sand can be added to make the mixture finer and more friable.

If you want to grow edible crops in containers, usually the best and most rewarding results are from vegetables. Certain fruit trees can also be grown in containers but do not produce as well as they would in the open ground.

Citrus, however, especially the dwarf varieties of lemons, oranges and naartjies, as well as kumquats and calamondins, grow well in containers and make extremely attractive container subjects. Quick-growing climbers like granadillas can also be grown.

To ensure good drainage, put down layers of stones, then container with the correct soil.

WHICH VEGETABLES TO CHOOSE.

The quick-growing, quick-maturing crops and the 'cut-and-come-again' vegetables are the best choice. Most salad crops are extremely successful and popular because of their good flavour when freshly picked. Only one or two tomato plants and peppers can provide you with plenty of fruit over a relatively long period, while a long trough of loose-leaf lettuce will go on producing leaves for months on end. Many of the spreading vegetables, such as cucumbers and courgettes, are easily trained up a trellis or wall, while climbing beans and peas take up less room than bush types.

Always be as selective as possible when choosing the actual cultivars. Many of the newer hybrids have been specially bred for container growing and it is worthwhile trying to get hold of them rather than the older types.

CONTAINER CANDIDATES

Beans - climbing
Beetroot
Broccoli
Cabbage - small head
Carrots - short rooted
Cucumber
Eggplant
Lettuce
Peas - climbing
Peppers
Potatoes
Radish
Spinach
Swiss chard spinach
Tomatoes, especially determinate and small-fruited types
Turnips

CONTAINER CARE

It is important to realize that plants in containers usually dry out far more quickly than plants in the ground. This is mainly because the surface and the sides of the container are exposed to the sun. As containers are often placed on a paved surface, this also reflects the heat, as do surrounding walls, particularly white painted ones. Water your container plants regularly. It is far better to check your soil than to follow a hard and fast rule of watering every day, twice a week or every five days. The quality of vegetables in particular can be spoilt if the plants dry out. Lettuces will quickly turn bitter if they get in the least bit dry. Weather conditions are an important factor in how often the plants need to be watered. Remember that when it rains, containerized plants get less water than those in the ground because of the smaller surface area - often the foliage is so dense that no rain will actually soak in.

Like all plants, your containerized ones will need regular feeding. This is especially important with vegetables as steady, vigorous growth is essential for top quality produce. While the usual granular fertilizers can be used, these are often difficult to apply to containers - too much can be applied or the foliage can be burnt. Water soluble, concentrated fertilizers, either artificial or organic, are a much easier and safer method. There are a number formulated for container plants and vegetables so follow the manufacturers' recommended rates of application and frequency. If you making liquid manure, water the plants every three to four weeks.

REPLANTING CONTAINERS

Before planting a second crop, you will have to replenish the soil as the original plants will have used up a great deal of its goodness. Small containers and troughs can easily be emptied and refilled with a fresh soil mix. This is not always practical for the larger containers. You will have to re-use most of the existing soil and add fresh material. Always take out the entire old crop, especially the roots. Loosen the soil as deeply as possible and take out at least a quarter of it. Refill the pot with a good potting mix or a rich compost. Add some old manure (fresh manure has too much nitrogen in it which could burn the plants) for the leaf crops but not for the root vegetables.

Because of the build-up of soil diseases and nematodes, try to alternate the crops in a simple form of crop rotation - this is especially important with tomatoes and potatoes. Growing marigolds in your containers for one season is another method which can help in clearing out nematodes.

POTTING SOIL RECIPE

2 parts garden soil
1 part coarse sand
1 part sieved compost or peat

Add 30 g of balanced fertilizer, such as 2.3.2, to each bucketful of the mixture, or use a generous handful of old manure and about 30 g of bone meal.

Tyre Gardens



Another form of containerized vegetable gardens is tyre gardens. Car tyres are freely available with roughly 11 million being thrown away in South Africa each year. There are many reasons why we use car tyres some are listed below:

- 1) A tyre will hold depending on the size of the tyre between 4 and 8 litres of water in the bottom rim. This will drastically reduce the amount of water being used to water your vegetables.
- 2) Tyres hold top soil and fertilizers which ultimately keep the soil fertile.
- 3) Tyres hold heat in winter allowing crops to be grown all year round
- 4) Tyres can be positioned in a way to stop excess rain water from flooding buildings, as well as prevent erosion.
- 5) Once the tyres are in there is very little maintenance that needs to be done.
- 6) Should one be moving, the tyres with vegetables in them can also be moved by simply placing a sheet of tin under the tyre to cover the whole.

Cutting the tyres

Firstly getting tyres, tyres can be sourced from any tyre dealer. They will want to make sure that the scrap tyres will not be resold on the black market but otherwise they are happy to dispense of them. Once the tyres have been

sourced we need to cut the top rim of the tyre of. It is important to note that when cutting tyres we only cut the side wall of the tyre and not the treaded part of the tyre. In the treaded part of the tyre is wire cables which make it hard to cut as well as damage the instrument you are using to cut.

There are three ways of doing this:

- 1) The first and most labor intensive way is cut the rim of using a Stanley Knife. It is vital when cutting with a Stanley knife to ensure that the following safety measures have been taken: Firstly one must be sitting with one leg on either side of the tyre. Secondly the height of the tyre must be higher than your legs to ensure that when you pull the knife towards yourself there is no way of cutting yourself. Thirdly rotate the tyre as you cut it to ensure the knife is kept away from your body and legs. Finally full concentration is needed as this is a dangerous process and one slip of the knife can lead to a nasty cut.
- 2) The second a far less labour intensive way is to cut the tyre using a jigsaw. This is the easiest and safest way of cutting the tyres. In order to cut with a jig saw one first has to drill or cut a whole in the tyre in order for the jigsaw blade to enter. Once this has been done it is a simple process of guiding the jigsaw around the rim of the tyre.
- 3) The last way is the most dangerous and not recommended unless you have a person who is trained and qualified in using a chain saw. The chainsaw method is by far the quickest, but at the same time the most dangerous.



Laying the tyre Gardens

When beginning to lay the gardens there are a couple of steps that need to be taken to simplify the process:

- 1) Arrange all the tyres in the same sizes, this ensure that when we lay the tyres the lines are straight
- 2) Mark out the vegetable garden with ropes in order to ensure when the tyres are laid they are laid in a straight line
- 3) Dig a rectangle trench of 30cm deep and dimensions of width 1m by length 3m.

- 4) Lay the first 3 tyres and fill two thirds with the adjacent soil. Once you have filled the 3 tyres place the next 3 in space you have just dug to fill the first 3 tyres. This is the most labor effective way of doing this
- 5) When filling the tyres with soil it is a good idea to sieve the soil to ensure all impurities (rocks, paper, plastic etc) are removed. The other benefits of this are as follows: The sieving oxygenates the soil, the softer soil allows for vegetables to grow quicker and easier. Fill the tyre 2/3 with soil and the remainder with compost.
- 6) A width of 4 tyres is optimal as it maximizes space however some people prefer to lay a width of 2 tyres as it is easier to reach the vegetables (especially elderly people).

Planting vegetables in the tyres



- 1) The gaps in between the tyres must also be filled with soil. In these gaps you can either plant vegetables in which case you add compost or fertilizer or if you are going to plant carrots just fill it with soil no compost or fertilizer is required for carrots.
- 2) Companion planting and staggered planting is recommended in the tyres in a similar way to which has been discussed in other parts of the manual.
- 3) In a small tyre you could plant 4 big plants e.g Broccoli, cabbage, spinach and a lettuce. In the gaps you should plant garlic, onions or

marigolds as these repel certain insects. Please refer to the appropriate section on companion planting

- 4) When planting in tyres it is important to plant a minimum of 5-10cm away from the rim of the tyre as this gives the plant the space for its roots to grow deep into the tyre.
- 5) The planting of potatoes has been explained in a previous chapter

POTATOS IN CONTAINERS

If you do not have enough space in your garden or the right position for potatoes, you can solve the problem by growing your potatoes in a number of novel ways (such as in barrels or plastic bags), one of the easiest being to grow them in tyres.

To grow potatoes in tyres, follow these simple steps:

Place a car tyre on the ground or on a paved surface in a sunny position. Fill it up almost to the top with well composted soil and add a tablespoon of 2.3.2 fertilizer.

Put about four or five sprouted seed potatoes into the soil and then cover with about 5 cm of soil; water well.

Keep the soil damp and when the shoots appear and have grown about 10 cm above the top of the tyre, put on another tyre and gently fill it in with well-composted soil, taking care not to break the plants. Feed the plants with a liquid fertilizer. Keep the soil damp.

When the plants grow through the soil again, put on another tyre and fill it Up. Feed again with a liquid fertilizer. You may be able to put on a fourth tyre before the plants start to flower. Keep the soil damp.

Once the plants have flowered and the foliage begins to turn yellow, you should harvest your crop.

From one set of tyres you can get up to 5-6 kg of baby or new potatoes - large storage potatoes are not suited to this growing method. You can also grow baby potatoes in thick black plastic bags or large drums, following the basic steps of covering up the potatoes as they grow.

GENERAL TIPS

Succession Planting

Succession Planting is a technique where not all the available space is used immediately for planting.

The way to do succession planting is to divide the available space into 4 sections. Plant your vegetables in the first section, wait 2 weeks, then plant the next section, wait another 2 weeks, plant the third section, wait another 2 weeks and plant the last section.

The reason that we practice succession planting is because this ensures a regular supply of fresh vegetable throughout the year.

If everything is planted at once, it will all be harvested at the same time and there will be a big time gap before the next harvest.

Companion Planting

Companion planting is a technique where we mix our crops together when planting. The reason behind this method is that it helps control insects because very often one plant may be a repellent to an insect that preys upon another plant. A good example of an insect repelling plant is tomatoes, others include onions and garlic.

Growing herbs, marigolds and foxglove amongst the vegetables are also repel insects.

BRICK BEDS



Vegetable gardeners are strongly encouraged to create bricked in beds. It is a lot of work in the beginning, but the rewards hugely outweigh the initial effort.

Experience has proved over and over that the crop yield in brick beds far exceeds that of other methods. In other words you get more out of the ground.

The beds are safe from being overgrown by encroaching grass and weeds. After a wet season, garden beds get swallowed up by grass and weeds.

Brick beds also help enormously in the conservation of water as the moisture does not leach off into the ground around the bed where it is not needed.

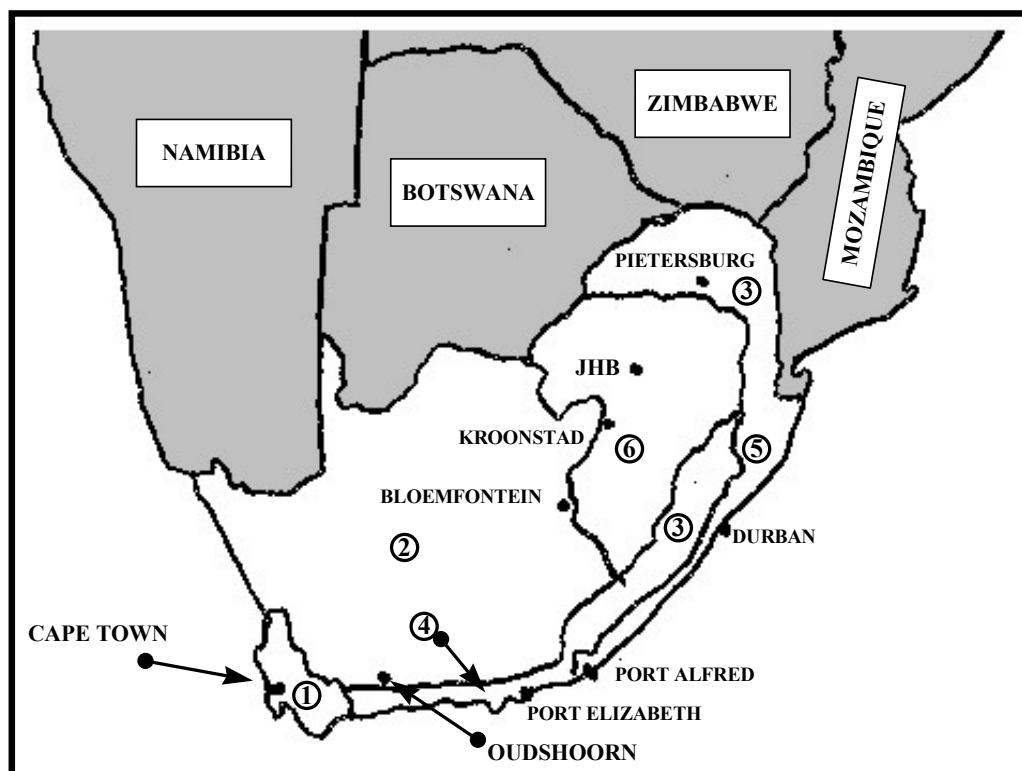
They also assist in pest control.

Most importantly though, they are permanent and easy to manage

One does not necessarily have to use regular bricks, half or broken bricks work equally well and are freely available. One can also use natural stones very successfully.

SEED-SOWING GUIDE

Below is the seed sowing guide. Simply find your area on the map and note the number in the circle, then find the column which has the number as a heading. The column on the far left shows the season and the month and all that is needed is to cross-refer in order to see what vegetables should be grown when.



	AREA 1	AREA 2	AREA 3	AREA 4	AREA 5	AREA 6
Summer						
December	Amaranth morog, bush & climbing beans, beetroot, cabbage, carrots, chillies, cucumber, greenpepper, lettuce, marrow, mealies, pumpkin, radish, squash, sweetcorn, tomato.	Amaranth morog, bush & climbing beans, cabbage, carrot, cucumber, radish.	Amaranth morog, bush & climbing beans, beetroot, cabbage, carrot, cucumber, lettuce, mealies, radish, sweetcorn, tomato.	Amaranth morog, bush & climbing beans, beetroot, cabbage, carrot, cucumber, marrow, mealies, pumpkin, radish, squash, sweetcorn.	Amaranth morog, brinjal, cabbage, radish, (chillies, greenpepper, & tomato may be planted in shade).	Amaranth morog, bush & climbing beans, beetroot, cabbage, carrot, mealies, radish, sweetcorn.
January						
January	Amaranth morog, bush & climbing beans, beetroot, cabbage, carrot, CM kale, leek, lettuce, marrow, pumpkin, radish, Swiss chard spinach, squash.	Amaranth morog, bush beans, cabbage, carrot, CM kale, kohlrabi, leek, lettuce, radish, Swiss chard spinach, turnip.	Amaranth morog, bush & climbing beans, beetroot, cabbage, carrot, CM kale, leek, lettuce, radish, Swiss chard spinach, turnip.	Amaranth morog, bush beans, beetroot, cabbage, carrot, cucumber, CM kale, lettuce, radish, Swiss chard spinach, turnip.	Amaranth morog, brinjal, cabbage, CM kale, chillies, greenpepper, radish, tomato.	Amaranth morog, bush beans, beetroot, cabbage, carrot, kohlrabi, CM kale, leaf mustard, leek, lettuce, radish, Swiss chard spinach, turnip.

February	Bush beans, beetroot, Chinese cabbage, carrot, CM kale, kohlrabi, leaf mustard, lettuce, radish, soup celery, Swiss chard spinach.	Beetroot, Chinese cabbage, carrot, CM kale, kohlrabi, leek, lettuce, parsley, radish, Swiss chard spinach, turnip.	Bush beans, beetroot, Chinese cabbage, carrot, CM kale, kohlrabi, leaf mustard, leek, lettuce, onion, parsley, radish, Swiss chard spinach, soup celery, turnip.	Beetroot, Chinese cabbage, carrot, CM kale, kohlrabi, leaf mustard, leek, lettuce, radish, Swiss chard spinach, turnip.	Amaranth morog, bush & climbing beans, beetroot, brinjal, cabbage, carrot, chillies, CM kale, cucumber, greenpepper, kohlrabi, leaf mustard, lettuce, marrows, New Zealand spinach, onion, pumpkin, radish, Swiss chard spinach, squash, tomato, turnip.	Beetroot, cabbage, carrot, CM kale, kohlrabi, leaf mustard, leek, lettuce, onion, parsley, radish, Swiss chard, spinach, turnip.
Autumn						
March	Beetroot, cabbage, Chinese cabbage, carrot, CM kale, kohlrabi, leek, leaf mustard, lettuce, lucerne, parsley, radish, soup celery, Swiss chard spinach, turnip.	Beetroot, cabbage, Chinese cabbage, carrot, CM kale, kohlrabi, leaf mustard, leek, lettuce, lucerne, onion, parsley, radish, Swiss chard spinach, turnip.	beetroot, cabbage, Chinese cabbage, carrot, kohlrabi, CM kale, leaf mustard, leek, lettuce, lucerne, onion, parsley, radish, soup celery, Swiss chard spinach, turnip.	Cabbage, Chinese cabbage, carrot, kohlrabi, CM kale, leaf mustard, leek, lettuce, lucerne, onion, parsley, radish, Swiss chard spinach, turnip.	Amaranth morog, bush & climbing beans, beetroot, brinjal, cabbage, Chinese cabbage, carrot, chillies, cucumber, greenpepper, kohlrabi, CM kale, leek, leaf mustard, lettuce, lucerne, marrows, New Zealand spinach, onion, parsley, pumpkin, radish, soup celery, Swiss chard, squash, peas, tomato, turnip.	Broad beans, beetroot, cabbage, Chinese cabbage, carrot, CM kale, kohlrabi, leaf mustard, leek, lettuce, lucerne, onion, parsley, radish, Swiss chard spinach, turnip.
April	Broad beans, beetroot, cabbage, Chinese cabbage, carrot, kohlrabi, CM kale, leaf mustard, leek, lettuce, lucerne, onion, parsley, peas, radish, Swiss chard spinach, turnip.	Broad beans, Chinese cabbage, kohlrabi, leaf~mustard, lettuce, lucerne, onion, turnip	Broad beans, beetroot, cabbage, Chinese cabbage, carrot, kohlrabi, leaf mustard, lettuce, lucerne, parsley, peas, radish, Swiss chard spinach, turnip.	Broad beans, cabbage, Chinese cabbage, carrot, kohlrabi, leaf mustard, leek, lettuce, lucerne, onion, parsley, peas, radish, Swiss chard spinach.	Amaranth morog, broad beans, bush & climbing beans, beetroot, brinjal, cabbage, carrot, chillies, cucumber, greenpepper, kohlrabi, leek, leaf mustard, lettuce, lucerne, marrows, New Zealand spinach, onion, parsley, peas, pumpkin, radish, Swiss chard spinach, squash, tomato, turnip.	Broad beans, cabbage, Chinese cabbage, carrot, leaf mustard, lettuce, lucerne, parsley, radish, peas, turnip.
May	Broad beans, cabbage, Chinese cabbage, carrot, kohlrabi, leaf mustard, leek, lettuce, lucerne, onion, parsley, peas, radish, turnip.	Chinese cabbage, leaf mustard, lucerne, onion.	Broad beans, cabbage, Chinese cabbage, kohlrabi, leaf mustard, lucerne, peas.	Broad beans, Chinese cabbage, kohlrabi, leaf mustard, lettuce, lucerne, onion, parsley, peas, radish.	Amaranth morog, broad beans, bush & climbing beans, beetroot, brinjal, cabbage, Chinese cabbage, carrot, chillies, cucumber, greenpepper, kohlrabi, leaf mustard, lettuce, lucerne, marrows, New Zealand spinach, onion,	Broad beans, cabbage, Chinese cabbage, lucerne, peas.

					parsley, peas, pumpkin, radish, Swiss chard spinach, squash, tomato, turnip.	
Winter						
June	Broad beans, cabbage, Chinese cabbage, carrot, lettuce, parsley, peas, radish, turnip.	Chinese cabbage.	Chinese cabbage, peas.	Broad beans, Chinese cabbage, lettuce, peas, radish.	Amaranth morog, bush & climbing beans, beetroot, brinjal, cabbage, Chinese cabbage, carrot, chillies, cucumber, greenpepper, leaf mustard, lettuce, lucerne, marrows, New Zealand spinach, parsley, pumpkin, peas, radish, Swiss chard spinach, squash, tomato, turnip.	Cabbage, Chinese cabbage, peas.
July	Beetroot, cabbage, carrot, lettuce, parsley, peas, radish, tomato, turnip.	Peas, Swiss chard spinach.	Peas.	Broad beans, beetroot, cabbage, carrot, lettuce, peas, radish, turnip.	Amaranth morog, bush & climbing beans, beetroot, brinjal, cabbage, carrot, chillies, cucumber, greenpepper, leaf mustard, lettuce, lucerne, marrows, mealies, New Zealand spinach, parsley, pumpkin, radish, Swiss chard spinach, squash, sweetcorn, tomato.	Cabbage, peas. (Chillies and greenpeppers may be planted in very protected areas)
August	Beetroot, brinjal, cabbage, carrot, chillies, greenpepper, kohlrabi, leaf mustard, leek, lettuce, lucerne, marrows, mealies, parsley, peas, pumpkin, radish, Swiss chard spinach, squash, sweetcorn, tomato, turnip.	Beetroot, cabbage, carrot, kohlrabi, leek, leaf mustard, lettuce, lucerne, peas, radish, Swiss chard spinach, tomato, turnip.	Beetroot, bush beans, brinjal, cabbage, carrot, chillies, greenpepper, kohlrabi, leaf mustard, leek, lettuce, lucerne, parsley, Swiss chard spinach, tomato, turnip.	Beetroot, brinjal, cabbage, carrot, chillies, cucumber, greenpepper, kohlrabi, leaf mustard, leek, lettuce, lucerne, mealies, parsley, radish, Swiss chard spinach, sweetcorn, tomato, turnip.	Amaranth morog, bush & climbing beans, brinjal, cabbage, carrot, chillies, cucumber, greenpepper, kohlrabi, leaf mustard, lucerne, mealies, New Zealand spinach, parsley, pumpkin, radish, Swiss chard spinach, squash, sweetcorn.	Bush beans, beetroot, brinjal, cabbage, carrot, chillies, greenpepper, leaf mustard, leek, lettuce, lucerne, peas, Swiss chard spinach, tomato.
Spring						
September	Amaranth morog, bush & climbing beans, beetroot, brinjal, cabbage, carrot, chillies, cucumber, greenpepper, kohlrabi, leaf mustard, leek, lettuce, lucerne, marrows, mealies, parsley, pumpkin,	Amaranth morog, bush & climbing beans, beetroot, brinjal, cabbage, carrot, chillies, cucumber, greenpepper, kohlrabi, leaf mustard, leek, lucerne, lettuce, marrows, mealies, parsley, pumpkin,	Amaranth morog, bush & climbing beans, beetroot, brinjal, cabbage, carrot, chillies, cucumber, greenpepper, kohlrabi, leaf mustard, lucerne, lettuce, marrows, mealies, parsley, pumpkin, radish,	Bush & climbing beans, beetroot, brinjal, cabbage, carrot, chillies, cucumber, greenpepper, kohlrabi, leaf mustard, leek, lettuce, lucerne, marrows, mealies, parsley, pumpkin, radish, soup	Amaranth morog, bush beans, brinjal, cabbage, carrot, chillies, cucumber, greenpepper, kohlrabi, leaf mustard, lucerne, mealies, New Zealand spinach, parsley, radish, sweetcorn.	Amaranth morog, bush & climbing beans, beetroot, brinjal, cabbage, carrot, chillies, cucumber, greenpepper, lettuce, marrows, leaf mustard, leek, lucerne, mealies, parsley, pumpkin, radish, squash,

	radish, Swiss chard, spinach, squash, sweetcorn, tomato, turnip.	radish, Swiss chard spinach, soup celery, squash, sweetcorn, tomato, turnip.	Swiss chard spinach, squash, sweetcorn, soup celery, turnip, tomato.	celery, Swiss chard, spinach, squash, sweetcorn, tomato, turnip.		Swiss chard, spinach, soup celery, sweetcorn, tomato, turnip.
October	Amaranth morog, bush & climbing beans, beetroot, brinjal, cabbage, carrot, chillies, cucumber, greenpepper, leaf mustard, leek, lettuce, lucerne, marrows, mealies, New Zealand spinach, parsley, pumpkin, radish, squash, sweetcorn, tomato, turnip.	Amaranth morog, bush & climbing beans, beetroot, brinjal, cabbage, carrot, chillies, cucumber, greenpepper, leaf mustard, lettuce, marrows, mealies, New Zealand spinach, parsley, pumpkin, radish, Swiss chard, pinach, soup celery, squash, sweetcorn, tomato.	Amaranth morog, bush & climbing beans, beetroot, brinjal, cabbage, carrot, chillies, cucumber, greenpepper, lettuce, leaf mustard, marrow, mealies, New Zealand spinach, parsley, pumpkin, radish, soup celery, Swiss chard spinach, squash, sweetcorn, tomato.	Amaranth morog, bush & climbing beans, beetroot, brinjal, cabbage, carrot, chillies, cucumber, greenpepper, leaf mustard, lettuce, marrow, mealies, New Zealand spinach, parsley, pumpkin, radish, soup celery, Swiss chard spinach, squash, sweetcorn, tomato.	Amaranth morog, chillies, greenpepper, mealies, New Zealand spinach, radish, leaf mustard, sweetcorn.	Amaranth morog, bush & climbing beans, beetroot, brinjal, cabbage, carrot, chillies, cucumber, greenpepper, leaf mustard, lettuce, marrows, mealies, New Zealand spinach, parsley, pumpkin, radish, squash, Swiss chard spinach, soup celery, sweetcorn, tomato.
November	Amaranth morog, bush & climbing beans, beetroot, brinjal, cabbage, carrot, chillies, cucumber, greenpepper, leaf mustard, lettuce, marrows, mealies, New Zealand spinach, parsley, pumpkin, radish, squash, sweetcorn, tomato, turnip.	Amaranth morog, bush & climbing beans, cabbage, carrot, chillies, cucumber, greenpepper, leaf mustard, lettuce, marrows, mealies, New Zealand spinach, pumpkin, radish, Swiss chard spinach, squash, sweetcorn, tomato.	Amaranth morog, bush & climbing beans, beetroot, cabbage, carrot, cucumber, leaf mustard, lettuce, marrows, mealies, New Zealand spinach, pumpkin, radish, squash, sweetcorn, tomato.	Amaranth morog, bush & climbing beans, beetroot, cabbage, carrot, chillies, greenpepper, leaf mustard, lettuce, marrows, mealies, New Zealand spinach, pumpkin, radish, soup celery, squash, sweetcorn, tomato.	Amaranth morog, mealies, New Zealand spinach, radish, sweetcorn.	Amaranth morog, bush & climbing beans, beetroot, cabbage, carrot, leaf mustard, lettuce, mealies, New Zealand spinach, radish, soup celery, sweetcorn, tomato.

COMPANION PLANTING TABLE

PLANT	COMPANION	EFFECT
Beans	Marigold	Repels beetles
	Petunia	Beans less likely to suffer from beetles
	Summer savoury	Beans grow more strongly
Beetroot	Onions	Beetroot grows better
Broccoli	Dill or mint	Broccoli grows better
Cabbage	Rosemary or sage	Repels cabbage butterfly
	Celery	Helps control grubs on cabbage
Carrots	Dill	Chemical secreted by dill improves health of carrots
	Sage or onions	Carrot fly is repelled
	Celery	Bush beans Help each other grow better
Eggplant	Amaranthus or nasturtium	Less likelihood of insects on eggplants
	Beans	Beetles repelled from eggplant
Fruit trees	Garlic	In a circle at base of tree it deters borers
Grapes	Clover or lupine	Increases soil fertility
	Hyssop	Vine crop increases
Leeks	Celery or onions	Leeks grow better
Lettuce	Chervil	Protection from aphids, snails and mildew
Potatoes	Beans	Potatoes less likely to suffer from beetle damage
Radish	Beans	Both grow better
	Lettuce	In summer, radish more tasty
Sweetcorn	Sunflower	Provides increased nitrogen to corn
	Borage	Soil nutrition improves for strawberries
Strawberries	Marigold	Helps control nematodes
Tomatoes	Marigold	Tomatoes grow and produce better
	Basil	Improves flavour and growth
	Thyme or peppermint	Helps control white fly

PEST CONTROL WITHOUT POISONS

The use of poisons and chemical based insecticides is discouraged for the following reasons:

They are serious health hazards and present a real danger to children. They are also indiscriminate in what they affect, pets and wildlife are also threatened.

They contaminate soil, of this fact there is no question. Ultimately they leach into the underground water supply.

They are expensive

There is no safe way of getting rid of tins and bottles containing left-over poisons.

RULES FOR NON-POISONOUS PEST CONTROL

Plant several different crops in each bed (polyculture) - not just one kind (monoculture). Different tastes and smells confuse insects

Rotate crops. As each crop is harvested replace it with a crop from a different family because different plant families are attacked by different kinds of insects. For example, replace members of the legume family (peas and beans) with members of the cabbage family (cauliflower, kale, broccoli, etc.). Remember that green peppers, tomatoes and potatoes belong to the same family.

Remove pests by hand and kill them. Check each plant every day. Because insects lay hundreds of eggs at a time every insect you kill really reduces the number of pests.

Quickly remove and burn damaged and diseased plants.

Grow anti-pest plants. Plants such as marigolds, nasturtiums, garlic and spring onions repel insects plant them in and around your vegetable garden.

Use home-made, non-poisonous methods to kill pests or keep them away from plants

ENVIRONMENT-FRIENDLY INSECT REPELLENTS

GARLIC SPRAY: Cut one whole garlic into small pieces, add two teaspoonsful of liquid paraffin and let it stand for 24 hours. Add 2 and a half litres of soapy water***. Mix well and strain into bottles. Keep bottles tightly closed and use the mixture when necessary. Spray it onto the plants or apply with a very small paint brush. Do not forget the undersides of the leaves.

CHILLI SPRAY: 4 chillies, 1 onion, 2 cloves of garlic, soapy water***.

Cut all the ingredients into small pieces. Cover with a little soapy water***. Let the mixture stand for twenty four hours. Add 1 litre of water and mix well. Strain into a bottle - keep tightly closed. Spray or paint onto plants when necessary

"BEETLE JUICE": Collect the offending pests (e.g. those large yellow and black monsters which eat roses), drop them into a tin of water to drown them, then pour hot water over them to make a strong "beetle juice". Leave for several days. Strain off the liquid and use as a spray.

WOOD ASH was used by our ancestors to repel pests. It is good for the soil as it contains potash and phosphorus. Finely sprinkle old dry wood ash around, but not touching, the plants. Never use coal ash.

SOME COMMON PESTS AND HOW TO DEAL WITH THEM

APHIDS (plant lice) (dinta tse fumanwang dimeleng/izintwala zezithomho)

Dip a sponge or small, soft cloth into soapy water and gently wipe aphids off plants. If the problem persists add a few drops of Jeyes Fluid ("dip") to the soapy water. Repeat this 3 times at 3-day intervals.

A strong spray of plain water often removes aphids (repeat this 3 times at 3-day intervals).

RED SPIDER MITES are tiny creatures which spin tight webs on the under-side of leaves and suck out the sap. They flourish in hot conditions and can be controlled by keeping the soil thickly mulched and spraying (especially the under-surface of leaves) with a fine, cool mist of water.

***Soapy water: Make a light lather using blue soap or Sunlight bar soap. Never use dishwashing liquid or other detergents.

ANTS AND TERMITES do not eat plants but they often bring aphids to plants so keep them out of your garden. Termites (called "white ants"), belong to a different family; they eat anything woody including dry mulches, the bark of trees and even furniture and floors.

Pour Jeyes Fluid (mixed with a little water), or urine down the ant holes. Crush dry chillies into a fine powder and sprinkle it where the ants are running.

SNAILS AND SLUGS travel and eat at night; they like cool, moist places and hide under garden refuse. Keep the area around your vegetable beds free from piles of dead leaves and other plant waste.

Collect and kill them every day in the early morning or the cool evening

Snails like beer. Push shallow containers into the soil and fill them with stale beer. The snails drown in the beer

Sprinkle crushed eggshells around plants - the sharp shells hurt the snails' soft bodies.

Snails and slugs are repelled by a mulch of oak leaves.

EELWORMS (Nematodes) are tiny parasitic worms which suck the juice from plant roots, and the eggs they lay cause knots to appear on the roots. This stunts and kills the plants. If plants collapse examine their roots for rootknot.

Mulch, compost and organic fertilisers produce organisms which prey on the nematodes.

Marigolds protect plants from being attacked by eelworm. Where there has been an eelworm infestation sterilise the soil 2 weeks before planting. (See under cutworm)

CUTWORMS cut down young plants at soil level.

Dig gently around the plant with your finger and you may find a curled up cutworm. Kill it. Protect young seedlings with a stiff collar made from newspaper or the inside of a toilet roll. Collars should be half in the soil and half above it.

A small stick placed upright in the soil next to the plant will stop this nasty worm from cutting the stem.

Finely crushed eggshells spread closely around small seedlings may help to keep cutworms away.

Soil which has been infested by cutworms or eelworms should be sterilised by soaking it with a strong solution of Jeyes Fluid (50ml Jeyes Fluid to 5 litres water) two weeks before planting time.

CABBAGE WORMS AND CABBAGE MOTHS. The worms come from the eggs which the moths lay on the leaves of cabbages and other plants.

Make a mixture of flour and salt and shake it onto the cabbage leaves through an old sock - just a very fine dusting on to the upper and lower surfaces of the leaves.

Cut tomato leaves into small pieces and place them on and around plants which are being attacked

Mix 1 teaspoon of salt in 2 litres of water, and spray onto plants.

BUGS AND BEETLES

Try keeping them off your plants with the chilli or garlic sprays (see above)
At night, place a lighted lamp on a stand in a basin of water, or hang the light above the water. The beetles are attracted to the light and fall into the water and drown. This works particularly well with Christmas beetles.

GARDEN FRIENDS

There are a number of creatures which eat garden pests but do not eat plants. Learn to recognise these creatures and know their ways and encourage them to live in your garden. (see FGF Quarterly Letter No. 54). Predators which help to keep down our garden enemies include spiders, ladybirds, lacewings, the praying mantis, lizards, frogs and insect-eating birds.

EARTHWORMS (dinonometane/umsundu) are harmless. They do not eat living plants but they do eat the organic matter which goes into the FGF trench beds, and convert it into wonderful humus. Earthworms also aerate the soil and make tunnels for water to penetrate to the deepest plant roots. Earthworm activity results in healthy soil. Healthy soil produces healthy plants, and healthy plants resist pests and disease.

Never kill earthworms or any other "good" creatures - they are valuable friends!