

# Lesson 2

## THE UNIVERSAL LAW OF PREPARATION

### LESSON SUMMARY

In this lesson you will

- Understand the importance of assembling information and acquiring skills as part of the planning process.
- Look at six things (sunshine, water, slope, wind, vegetation and aspect) which you have to take into account when you decide **where** to locate your garden.
- Understand the limitations that labour, tools, fertilizer availability and finance provide.
- Start your garden.
- Learn the importance of composting.
- Learn how to prepare the ground to plant your first crop and your first trees.
- Look at plants and diseases from a new perspective and learn how to deal with pests and diseases.

### SUMMARY OF LESSON 1

In Lesson 1 we looked at the idea of universal purpose and individual purpose (the reason we are here on Earth) as motivating forces which move us towards a vision we hold for our future. The question "Is there something important you are supposed to do in this lifetime?" was posed.

The benefits we gain from having a productive garden and growing some of our own food were outlined.

The idea of identifying a starting point and having a vision of what you plan to achieve was introduced as the way to start developing a plan of action.

### REVIEW

#### Task 1

Before starting on this lesson, take time to review what you read in Lesson 1.

1. Identify 3 ideas from Lesson 1 that make sense to you.

---

---

---

---

---

---

---

2. Identify 3 concepts from Lesson 1 that take you out of your comfort zone.

---

---

---

---

---

3. What would you tell a friend if they asked you why you want to have a garden and grow some or all of your own food?

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

4. List the words that describe how you feel about your garden project

---

---

5. On a scale of 1 - 5, rank the following ideas in terms of how much they differ from your own philosophy. A ranking of 1 means they are in alignment with how you think. A ranking of 5 means they are way outside your comfort zone and you don't give them any credibility at all.

- |                                                  |   |   |   |   |   |
|--------------------------------------------------|---|---|---|---|---|
| a) Everything has a purpose.                     | 1 | 2 | 3 | 4 | 5 |
| b) Vividly imagining helps us achieve our goals. | 1 | 2 | 3 | 4 | 5 |
| c) I am a co-creator with Universe.              | 1 | 2 | 3 | 4 | 5 |
| d) Food supply disruptions are possible.         | 1 | 2 | 3 | 4 | 5 |
| e) Nature provides 95% of plant inputs free.     | 1 | 2 | 3 | 4 | 5 |

5. What questions do you have? By the end of this programme you should have the answers to your questions.

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

## THE LAW OF PREPARATION

Preparation is a two-stage process. First we assemble information and skills which provide the framework on which we make decisions. The second step is to take action. The extent and intensity of the preparation depends on the scope and magnitude of what is to be achieved.

Ten years ago I personally didn't realise the importance of preparation. I didn't do my homework. I didn't have the information I needed to make appropriate decisions when I first started the gardens at "Castelen". It is for this reason that I am very knowledgeable about how **not** to do things and in the process have become quite skilled at doing things better. Had I known the importance of getting things right first, I would have saved myself much frustration and many failures but wouldn't have learned as much as I have done.

What is interesting to me is the idea that preparation and completion are both aspects of creation. Before we can go forward to a new level of creation, we must first go back and identify what we have already learnt, remember the skills that we already possess and "clean up" any unfinished business.

In your garden, the same principles apply. You cannot re-plant until you remove what is left from the last crop, take out the weeds and at least, add back the nutrients that have been taken out by the crop you have just harvested. At this time it is appropriate to question what you might have done better, or differently when you planted the earlier crop. Perhaps the seeds were planted too deep or too close together. Perhaps you planted too early in the season. Sometimes it is obvious that you haven't spent enough time on maintenance. Over and over again you repeat the process, each time hoping to do things better because of what you have learnt. In this way, each completion brings you to a new level of expertise for the creation of something better. We see, over and over again, the preparation and completion phases. We do things. Sometimes they work and sometimes the results are not as we would wish. Unless we live with the misconception that we can do things the same way and get a different result, we learn both from what works and what doesn't.

If what we have done has been successful, we gain confirmation that we are on track. If we don't get the results we want, we know it is necessary to do something different.

At all times, no matter what we do, we realise that nature is in charge. Hail storms have the potential to damage crops. An unexpected period of cold or abnormally hot weather will cause problems. All we can do is create the best possible environment for our plants to grow, knowing that this will minimise damage from unexpected weather patterns.

Plants germinate, grow, produce fruit or vegetables and then die. We cannot help but marvel at the preparation that has gone into creating the blueprint that tells the lettuce seed how to become a lettuce and create hundreds more lettuce seeds before it dies. What makes this idea so extraordinary is that within that minute little lettuce seed there exists an actual visible blueprint of what the mature plant will look like if the things it needs are provided. I wonder, as humans, whether in our DNA we carry a similar blueprint of how our lives would be if everything needed to actualise that blueprint was provided.

Depending on what you have to work with in creating your garden, you may need to spend time working on the foundations before you start to make progress. Perhaps your soil is so infertile that, before you do anything, you need to improve it. Perhaps you don't have adequate water and you will need to install a water tank or put in an irrigation system. Perhaps your land is so overgrown that you will have to cut down some trees, or prune back the growth. Perhaps the land is too steep and you will need to terrace it before you start.

As in a building, your preparation may actually involve going in what appears to be a backward direction. Sometimes, as with a building, we dig ourselves a very big hole and may stay in it for a long time. No matter how hard we work, we have to endure being in the hole for a long time. Sometimes it may be necessary to wallow there, because this provides the motivation to do what it takes to move forward.

I have had to "wallow" in a mess of my own making, whenever I have started work to expand or do things differently. One area I planned to bring into production was not very fertile. I brought in a load of chicken manure and hired someone with a bobcat to spread it. Within weeks, weeds were three feet tall. It took over 3 years to bring this area under control and make it

productive. Progress always seems to entail making a mess and then having to clean it up!

I suppose if I were to be content with things as they are, I wouldn't get into a mess, but just doing what I know how to do, seems boring. When I take on a new challenge, I step into new territory where I don't have all the answers. Sometimes the answers come in the form of more mess or other type of hindrance. I have come to realise that hindrances call things to my attention that require investigation. Investigation leads to greater understanding.

One thing I have learned is that if I want something to change permanently, I have to get it 100% right. When you build on a foundation that's only 90% in place, you will have to keep going back to fix it.

## CHOOSING GARDEN SITE AND PREPARING LAND

### Location

Your first step in building your garden is to decide where to locate it. Remember the major considerations when you make this decision are **sunshine, water, slope, wind, vegetation and aspect**.

### Sunshine

Your site should have as much sunshine as possible. Remember that the sun is much lower on the horizon in winter so take this into account when you make your choice. Some areas that look quite suitable in summer are totally shaded in winter when the sun is lower on the horizon. Of course, if your land is covered

in snow all winter and you have a limited growing season, it won't matter if that area doesn't receive a lot of sunshine in winter.

### Water

Whilst we will be discussing ways to make the water you use as effective as possible in a later lesson, the amount of available water is the limiting factor for your garden. If you have inadequate rainfall, variable rainfall or markedly seasonal rainfall you will need access to additional water. Town water, if you have it, is not your best option. It has chlorine in it and probably a number of other chemical additives including fluoride. If this is your only option, use it. Your garden soil micro-organisms will work to eliminate the "nasties".

A better option is to save the water that falls as rain on your roof. You may want to install a system, which will take the water from your roof and into a storage tank. Tanks installed above ground will allow you to water by gravity.

If you already have a dam, spring, bore or stream you may need to install a pump to get the water to your garden. For this you may need professional help. Pumps are not expensive and you can lay the pipes by digging trenches from the water supply to your garden. If you have access to a good water supply, the very best investment you can make is to install an irrigation system incorporating a fertigation tank. We will discuss this later in the programme.

Even though Mt Tamborine has high rainfall, investment in irrigation systems has been truly worthwhile. We have installed an automated system for the orchards, which turns the water on for a set time and cycles through six set areas so that the entire orchard gets water. Part of this system is a drip feed area for the blueberries which do not need as much water as the avocados.

There is a separate line from the holding tank, which waters the macadamia trees and has to be turned on separately.

The vegetable system is not automated. Each area has to be turned on and off by hand.

Pipes in both the orchard and to the vegetable gardens are buried underground. Pipes within the garden are on the surface so that they are visible. In the orchard there are sprinklers under each tree. The vegetable gardens are watered by spray systems or by sprinklers, which are fixed to overhead wires to extend the area that is watered.

Maintenance of the irrigation systems is an ongoing chore. Pipes are regularly speared with forks or picks or run over by the mower. Even so, having the ability to provide water to the gardens has been a real asset and well worth the expense and the time spent on maintenance.

A water tank, which takes water from the packing shed roof, is used for washing vegetables. If we needed it, it could be used for the gardens.

## **SOMETHING TO THINK ABOUT**

"Over the years I have taken photographs of crystals made by freezing water. I often first expose the water to written words, freeze it, and then compare the various crystals that result.

Different water may appear to be all the same, but when one sample is exposed to positive words such as "thank you" and another sample is exposed to negative words such as "stupid", the two samples form distinctly different types of crystals. The "thank you" crystals are balanced and well formed, while the "stupid" crystals are deformed and broken. The energy of words

is reflected in the formation of crystals and depending on the words, the crystals are either beautiful or unsightly.

Since our bodies are 70% water, we can infer from the crystals that the water within us also contains the energy of the words we use. If you think about water in terms of its quality, then it is easier to understand the energy contained within water.

What can we do to purify all the water within our bodies? Simply use good words on a daily basis. Water exposed to the words love and gratitude is filled with the most joy".

*Masaru Emoto "The Miracle of Water"*

### **Slope**

You cannot change the slope of your land but if it is too steep, you may need to do some work before you start. Terracing and building retaining walls of rocks or timber may be necessary.

One of the most productive and beautiful vegetable gardens I have ever seen is on a very steep slope. Huge boulders help to retain the soil. The only problem with gardens built on slopes like this is that fertilizer washes down the slope under the boulders. Rather than trying to stop this happening, you can make use of it by planting fruit trees below your garden where they will receive a constant replenishment of fertilizer. If fruit trees are to be planted on a sunny down slope below the garden, remember to plant them far enough from your garden so that they won't block the sunlight when they grow large.

### **Wind**

Wind is a major factor affecting plant growth, which is why many old gardens were surrounded by high walls. High walls stop wind and increase warmth by storing and also reflecting the sunshine. Building a wall is a major financial commitment, but you could do something similar by building a trellis at the "back" of the garden. The "back" is the area where the trellis

won't block the sunshine. The trellis could be built of solid wire netting on poles or it could be made of timber slats. The trellis has the benefit of providing somewhere for vines such as passionfruit or boysenberries to grow and for you to plant climbing vegetables like snow peas or beans.

An alternative to a trellis is to plant a row of fruit trees but remember to site them well away from the garden. In the "Ringing Cedars" series of books, rows of trees like this are called "living hedges" which is a lovely concept.

### **Vegetation**

Where possible site your garden away from large trees. Their roots are a problem and the goodness you add to the soil in your vegetable garden just encourages the trees to grow that much faster. Trees growing near gardens are also a problem in terms of shade.

### **Aspect**

Ideally, if you live in the southern hemisphere, your slopes should face towards the north, and if you live in the northern hemisphere, they should face towards the south. This is the situation to maximise sunshine. The further north or south of the equator, the more aspect becomes a problem because the sun is much lower on the horizon the further you get from the equator.

Unless you live in an area of very high surrounding hills or mountains, surrounding slopes are unlikely to block out sunshine. Trees and buildings however, can do this. If you have high trees or buildings, which interfere with sunlight, particularly in winter months, you would be wise to look at changing the location of your vegetable garden.

## **OTHER CONSIDERATIONS**

As you are making a decision as to where things should be located and how much land you intend to cultivate, there are some other factors you need to look at. These include labour, tools and equipment and finance. It would be a good idea to think about these before you get started.

### **Labour**

More than anything else, labour will determine the size and productivity of your garden. The rule is to **start small**. Once you get the area you have started under control in terms of weed and fertility management, watering, planting and rotating your crops, you can enlarge it. If you start too big, you may become overwhelmed because everything needs to be done at the same time and the weeds start taking over.

### **Tools**

As a minimum, you will need a garden fork, a spade, and a trowel and some good secateurs and clippers. You will also need a hose, a strong wheelbarrow and a compost bin. You can build your own compost bin or simply buy a metal garbage tin with a firmly fitting lid and punch holes in the bottom.

### **Equipment**

Equipment makes life easy but is not essential to start. Be prepared to do things the hard way at first, because that way you know what is really important. Our equipment is minimal. Probably the most useful investment we made was to purchase two fertigation systems and a powerful mower with a trailer. This is used every day. Having a powerful chain saw has been a boon. A good whipper snipper is also a very useful piece of equipment but in a small garden a pair of sharp clippers would do the job quite adequately.

## **Fertilizers**

It is most likely that your soil will be less than perfect. To get a quick boost in fertility you should aim to buy or collect 20 kg of animal manure: sheep, cow, horse, pig or poultry, for every square metre of garden you are proposing to cultivate. For each metre of garden you will also need 10 kg of blood and bone and/or a high quality all-purpose fertilizer, which contains as many trace elements as possible and includes seaweed, a source of carbon and base elements. You will also need 1/4 bag of lime for every square metre of garden. Start collecting newspapers and non-waxed cardboard. You will need this to completely cover your proposed garden bed with a 2 centimetres layer of paper and/or cardboard. You will also require large quantities of some or all of the following: grass clippings, straw, sugar cane mulch, sawdust, woodchips, and/or fallen leaves. Finally you need to source a supply of small, good quality potatoes. You can ask your local fruit and vegetable shop if they have any potatoes that are already sprouting. Alternatively, you can get some at your garden shop or even order them through the Internet.

## **Finance**

You can spend large amounts on your garden. You can buy animal fertilizers, mulch, compost and fancy equipment. You can put in elaborate borders, trellises, irrigation and fertigation equipment. You can buy mowers and trailers and cutters.

Another strategy is to substitute labour for money. You can water with a hose or bucket. You can mow with a hand mower. You can collect animal manure from a nearby farm or stable and make your own compost. It takes more time to do this, but you get the same end result. Whatever way you do it, the vegetables will taste the same.

Things you cannot scrimp on are seeds, tools and fertilizers. Initially, you will need fertilizers to bring up the fertility of your

soil. Later, when you start composting and recycling your garden rubbish, fertilizer usage decreases and you only need to replace that which has gone into what you have eaten, sold or given away. Good fertilizers contain a full range of elements. Check the label when you buy to find out what elements are in the fertilizer. Always buy the most complete fertilizer you can afford. Blood and bone is excellent as is any fertilizer that contains seaweed or fish because the sea is the best source of minerals.

Another source of minerals is basalt crusher dust. Over time, crusher dust breaks down and releases minerals. Crusher dust is probably the cheapest way to re-mineralise your soil but it takes time to break down.

If you live near the sea, you can collect seaweed and use this. Seaweed is probably the most complete fertilizer you can use on your garden.

## **History**

Land has a history just as we do. Sometimes, things that have happened in the past will affect your soil now. We would have been much wiser had we enquired about the history of the property we purchased. Before we bought Castelen the land was used as a dairy farm. The farmer didn't believe in fertilizers so for decades the land was stripped of many nutrients. The soil was extremely deficient in calcium as well as many other minerals. Cows use a lot of calcium for milk production and this comes via the grass from the soil. When milk was sold, the calcium left the farm.

If you purchase land where poisons have been used, where there has been extensive use of chemical fertilizers or where animals have grazed you may have work to do to rectify the damage and restore the soil's fertility level.

## GETTING STARTED

Having selected and marked out your garden bed area, you can start your garden. Your first crop is going to be potatoes. These grow best in spring and summer but you can also get a crop in winter, if the temperatures are above freezing. A good tip is to put the potatoes in the refrigerator for a few weeks. Potatoes start to sprout when temperatures rise i.e. when you take them out of the refrigerator! If your potatoes are already starting to sprout, store them in an old hessian bag somewhere dark while you get ready.

At this stage we are suggesting a no dig method which will get you started quickly and will quickly make your soil fertile and easily worked. As mentioned earlier, **you will need 20 kg of animal manure, 10kg of high quality fertilizer or blood and bone and ¼ bag of lime or gypsum per square metre of garden.** Mark out the area of your intended garden and cover it with half the animal manure, fertilizer and lime. Cover everything with **paper and cardboard.** Make sure that this is laid very thickly and overlaps so that no sunlight can get through to the grass and weeds underneath. When this is done, **cover the cardboard layer with the balance of the fertilizer, animal manure and lime.** **Now place your potatoes on top, about 15cm. apart. Finally, cover everything with mulch.** You can use sugar cane, hay, lucerne, or even mulched tree clippings. **Ideally this layer should be more than 10 cm thick. Now it is time to water your garden and wait.** In a few weeks you will see the potato plants emerge and in a couple of months your garden will have a flourishing cover of green and your potatoes will start to flower. Remember to water them occasionally. Wait till the potato bushes start to die down before you push aside the organic matter and collect your first crop. The potatoes you harvest will reimburse you for your initial financial outlay for manure and fertilizer.

## WHAT ARE THE BENEFITS OF USING THE METHOD DESCRIBED TO PREPARE NEW GARDEN AREAS?

There are a number of different ways you could have started your new garden area. You could have used herbicides to poison the weeds and then dug or rotary ploughed the ground. You could have removed the top of the soil and all the weeds and grass. You could have painstakingly weeded and dug the whole area. These methods have a number of disadvantages.

**Herbicides** kill all plants, not just the ones you want to get rid of. Many of the soil micro-organisms that are so important are microscopic plants. Using herbicides kills them. When you remove even one element from the inter-connected web of life that exists in the soil, you upset the balance. There are many other reasons why herbicides are not a good idea and we will deal with these later.

**Removing the weeds and topsoil** removes much of the organic matter in the soil, which has taken years to develop. This is where much of the initial fertility you will be using, is stored.

**Weeding and digging** is time consuming and tiring. If you use the method I have described, when it becomes time for you to dig in order to build the troughs and ridges you will use later, you will find the soil is soft and easy to work. This method saves many hours of your precious time and lots of energy.

**Ploughing** with a rotary hoe turns the soil upside down and kills soil micro-organisms. Algae, that likes to be up the top near the sunlight, ends up buried deep in the soil. Worm tunnels are



shattered. Micro-organisms that like deep dark homes find themselves right near the surface.

When you use the cardboard, mulch and fertilizer method you are doing a number of different things to get your garden started quickly.

Using cardboard and paper layers shuts out all the sunlight so that the weeds and grass die without you having to do anything more. Unfortunately this method doesn't kill the weed seeds! When the cardboard breaks down, weeds will happily start to grow.

Using this method the grass, weeds and their roots, become humus for your garden and since increasing the humus level is your number 1 priority, the things that you probably thought of as a nuisance, have just become a benefit. The cardboard and paper, since they have been made from a wood product, cellulose, also become humus as does the mulch you laid on top. The fertilizer, manure and lime help break down the organic matter and also provide food for the potatoes that are growing. Even the potatoes are working for you. Their roots help to break down the cardboard and work their way into the soil underneath. When you harvest, your garden is immediately ready to plant.

The large amount and variety of fertilizers is necessary because, unless you have done a soil test, you really don't know what elements are missing. When you add all the nutrients, plants can choose to take in what they need to grow.

## **THE NEXT STEPS**

You may think that here is nothing to be done while your potatoes are growing but it is important to start thinking ahead.

Use this time to build a permanent compost area, organize borders round your garden, build trellises or water collection and distribution systems. You will need these things in place as soon as you harvest your potato crop because that is when you will be planting a second crop.

## **COMPOSTING**

Once you have got your garden started the next task is to organize a way to supplement your garden with organic matter. Composting is the way to do this.

Building a compost pile is rather more involved than just throwing stuff onto a pile and leaving nature to work miracles. It takes time and effort to do it right.

What we're doing with your compost pile is creating an environment so that micro-organisms can break down organic matter (grass, vegetables, leaves) into humic acid that is "food" for soil organisms. To do this we need both the "food" and the micro-organisms whose job is to "digest" the food we provide.

Not all the food we put in our compost bin is going to provide the full range of nutrients. We can help ensure that the end product has as many of the natural elements as possible by adding a variety of inputs. Feeding the microbes will ensure they have plenty of readily available food, which will cause them to multiply. When you "feed" the micro-organisms animal manures, fish emulsion, kelp, blood and bone, humic acid, and molasses they will multiply quickly. You can also add some of your fertilizers and lime, which will be "eaten" by the micro-organisms and be turned into plant food within the compost pile. You can even increase the number of microbes by purchasing a microbe inoculant, mixing it up in warm water and pouring over your compost pile.

If you have a small garden area and live in a crowded suburban area, you will need to be careful to have compost bins that won't attract rats and mice and give off bad smells under your neighbour's windows.

One way to do this is to buy two metal garbage bins with lids. Punch holes in the bottom of your bins and place them on grass, in a sunny area, well away from the house. Put all your household scraps, grass clippings, leaves and weeds into the first bin along with some soil, a little water and a little bit of animal manure and fertilizer from time to time. The lid will protect your compost as it turns into compost. When your first bin is full, start the second one. Turn your first bin upside down and empty the contents into the second bin. This will aerate the contents, mix them up and speed up the decomposition process. The compost that remains in the first bin will act as a "starter" culture to speed up the decomposition process. When you empty the compost from one bin to the other you will notice how much the volume of material has decreased. You need lots of input to get quite a small amount of compost for your garden.

If you can't afford to buy metal compost bins, start by burying your kitchen scraps in the garden. Just dig a hole and cover the scraps with a thick layer of soil remembering that the rotting food you are burying is food for quite a range of animals and birds. You can achieve quite good results just doing this simple task on a regular basis. One of the best rhubarb patches I have ever seen was created in an area where kitchen scraps had been buried.

If you have a slightly larger area to work in, and fewer neighbours, you could use old tyres piled on top of one another as your compost bin.

Large-scale organic farms make compost in windrows and turn them with huge machinery or buy truckloads of animal manure, cover it and leave it for a year or so before using it. We're not suggesting you need to do this. You can make compost in a relatively small, contained area by building a structure to keep it all together. One idea is to use star pickets joined with wire walls. You could put in posts and nail corrugated iron to them. You could do, as we did, and use cement blocks and build a structure but if you do this, I suggest that you would do well not to use the same "builder" we used!

You start building your compost with a range of materials. Ideally, each layer should be no more than 15cm thick. It is preferable to start with a base of such things as twigs or other coarse material such as corn stalks, banana leaves. Then you layer such things as straw, leaves, vegetable waste from the kitchen or garden, animal manure and seaweed. Grass clippings can be used but each layer should be quite thin because grass tends to stick together and form a glutinous mass. Between the layers you can use lime, rock dust and/or sulphate of ammonia covered with a thin layer of soil. Woodchips and twigs improve the porosity and oxygen distribution within the interior of the pile and result in a more uniform aerobic form of composting and improved compost structure. As you add each layer hose it and make sure the pile is quite damp but not sodden.

When the pile reaches about 1 - 1½ metres high you are finished the initial step but there is more to do. The first thing you need to do is to cover your compost with a sheet of plastic and leave it to "cook" for 3 - 4 weeks. The time it takes will depend on the temperature. Your compost pile will break down more quickly the hotter the temperature. You can see how quickly the decomposition is occurring by watching the level of your pile. When it is about half the original height, it is time to

turn it. It is desirable to turn your compost about 3 or four times before you use it on your garden.

Turning is the reason why it is a good idea to have two or more compost bins. One is for compost that is maturing. One is for green material from your garden that is being collected for the next compost pile. The third is spare. This is the bin that you turn your compost pile into.

The ideal heat for a compost pile is just below 65 °C (150 °F), which is sufficient to kill weed seeds. Problems occur when the compost becomes too hot, too wet or not hot enough.

When compost heaps become too hot delicate humus and humic acid complexes become degraded. Oxygen through the pile will help prevent it becoming too hot and will also prevent it from becoming sour. One way to aerate the pile is to lay plastic agricultural drainage pipes horizontally at various levels of your compost pile allowing them to poke out beyond the pile. Because the pipes have holes in them, air will flow through the pipe and into the centre of your compost and help control the temperature. The composition of the material you are composting contributes a lot to how much or how little oxygen there is within the pile. Coarse material in layers is good because it allows air spaces.

If the pile is not hot enough, weed seeds remain viable and will cause problems when you use the compost in your garden. You can heat your pile by adding more animal manure and less coarse material.

When the pile becomes too wet, which is what happens when you leave it uncovered and it rains heavily, the whole pile becomes saturated, forcing out the oxygen. Only anaerobic microbial activity occurs in saturated compost piles causing it to smell rank and sour. The aerobic micro-organisms are killed

when there is no oxygen. If this happens, add your partially composted material to a newly created pile, in layers, and add as much animal manure and coarse material like leaves and twigs as possible.

Ideally compost should be turned regularly to keep it aerated. We have a family of scrub turkeys who live on our property and they know they are not allowed to scratch through the gardens and generally they follow the rules. No such rules apply to the compost heaps however. The turkeys spend hours scratching and tossing everything over the sides for me to shovel back. The good thing about this is that my compost gets turned regularly.

The best compost develops when you add a variety of different things: kitchen scraps, vegetables that have finished producing, garden soil, grass clippings, newspapers, tree clippings and leaves, animal manure and some of your fertilizer. Worms don't like onions and citrus peel so don't add these to your compost. Add a little water and everything will start to break down into valuable humus which is a very important future addition for your garden.

One final thing to remember is that if all the material in your compost pile comes from your own garden, you will be recycling those nutrients that are already present. If you want to remedy nutrient deficiencies, you have to bring in material from areas that are high in nutrients. The sea is the best place to get material that is nutrient high.

If you're going to make your own compost do it right. Poor compost can inhibit plant uptake and assimilation of nutrients. It can add toxic compounds, disease organisms and weeds to the soil.

## Why COMPOST?

The value of organic matter cannot be over-estimated. Organic carbon comes from decayed organic matter. Organic carbon is the food of soil micro-organisms. Micro-organisms break down organic matter and get energy and carbon in the process. Compost provides a source of food for plants. The fact that plants donate 30% of all the sugars they produce from photosynthesis to the micro-organisms that live around their root systems, gives you an idea of how important it is for plants to have micro-organisms helping them. There is a mutually beneficial relationship.

The most important thing that happens in soils is the break down of organic matter and the release of the nutrients, which can then be taken up by the plants growing there. The composting process turns organic waste matter into humus, which is a vital component of a healthy soil.

Chemical farming was successful initially because the chemicals work in the same way as drugs do in humans. They speed up natural processes. In soils, the effect of adding chemicals is to speed up the breakdown of the organic matter in the soil, releasing the nutrients for plant growth. Unfortunately, this process has led to a major decrease in soil organic matter, since chemical fertilizers were first introduced. A decrease in humus levels has led to a major degradation of soils for the following reasons:

1. Humus absorbs almost twice its weight in water. Humus rich soils can soak up heavy rain, which means there is reduced runoff and minimal leaching. When soil contains only a little humus, heavy rain splatters onto the hard surface causing compaction and then runs off, carrying valuable soil particles. Flooding occurs more frequently when heavy rain falls on soils that have been depleted in humus. Unable to penetrate the

soil, the rain runs off, quickly making its way to the nearest stream or river.

By contrast, rain that falls on soil that has a high humus content, penetrates the soil where it is stored as a film on tiny soil crumbs called aggregates. Plants can access this water during dry periods.

Microbes that live in stable humus conditions excrete mucilage. This also helps retain moisture in the root zone.

2. Because of its ability to form stable complexes, humus isolates and immobilises heavy metals, chemical residues, toxins and even man made poisons in a form that reduces harm to plants.

3. Humus contains a high percentage of carbon plus the elements that were originally contained in the organic matter that has been turned into humus. These are slowly released into the soil as a result of the micro-organisms whose job is to turn humus into food for plants. As you build up the humus content of your soil, the need to add fertilizers decreases. **Humic acid** and **fulvic acid** are the end products from composting. These acids **chelate** (hold onto) nutrient ions in a form available to plants but safe from leaching.

4. Humus slows down leaching. Tiny particles of humus, called colloids, have a negative charge. They attract positively charged elements such as potassium, sodium, calcium, iron and copper. Colloids hold onto these minerals, preventing them from being dissolved and carried away by water.

5. Humus is a storage system for all the beneficial microbial exudates (substances given off through the roots of plants which provide food for microbes) including enzymes, vitamins, hormones and antibiotics. Humus provides food for microbes,

worms and other beneficial soil organisms. Vitamins, hormones, antibiotics and other biotic substances are released as humus decomposes. Because it is mobile within soil, nutrients are readily available to plants. Humus holds nutrient ions in a form available to plants but safe from leaching.

6. Soil is dark in colour when it contains humus. Dark soil absorbs heat from the sunlight. Plants growing in soils that are rich in humus can tolerate frosts much better than plants in soils with a low humus content, which means they have a longer growing season.

7. Humus neutralises pH, the acid/alkalinity measure of your soil. Materials such as rock phosphate, crusher dust, lime and gypsum become more easily soluble when humus is present.

8. Humus improves soil structure, creating a spongy, porous and sticky crumb structure, allowing oxygen and water to penetrate deep into the soil. A hard clay soil becomes more porous and crumbly when humus is added. Sandy soils are bound together by humus particles, allowing the soil to better hold onto water and nutrients.

9. Compost contains amino acids, which have a positive effect on the growth of plants.

## **WWOOFER STORY**

Wwoofers come from a variety of different countries, are aged from 18 to 70 and have vastly different levels of experience and abilities. Our compost bin "builder" was a young man of limited practical skills and capabilities. Realising this, I tried to find something that he could do. Unfortunately most of the simple

tasks I suggested seemed to be too hard, or didn't appeal. Eventually I asked: "What do you like doing?"

In response to this question, he told me about the time he spent with his uncle who is a builder and told me he liked to build things. Our compost bins had had, some time earlier, a minor altercation with the tractor and had come off second best. "You can rebuild the compost bins," I told him. The existing compost bin was still standing - just. I told him to make the new just like the one we had constructed years earlier. In his view, he was an experienced builder, so I helped assemble the things he needed and left him to get on with the job.

One of the good things about compost bins is that it doesn't matter what they look like. They can have crooked walls, a funny shape, holes where there aren't supposed to be any and still do the job. Our Wwoofer-built bins have been standing (perhaps leaning is a better description) for over three years, and they make great compost. The construction won't win any architectural awards, but it fulfils the need for which it was built and that's the only thing that really matters.

## **PREPARING FOR TREES**

It is easy to go out and buy some trees and plant them, but if you want your trees to grow fast, stay healthy and produce lots of fruit and nuts there are some things you need to do before you purchase your trees.

The first is to select your fruit trees wisely. They are expensive to buy and you must be aware of which trees grow well in your area. Trying to grow papaya in an area that has frosts is asking for disaster. Different trees have very different growing

requirements, so do your research and be aware of their needs, before you invest your money.

The second rule is to prepare your soil well in advance. Allow a minimum of 6 months soil preparation time before you plant your trees.

### 1. Choose an appropriate location

Choose your location wisely. Remember that the trees need sunlight as their first priority. Remember also, that as the trees grow they will shade the area away from the direction of the sunlight.

### 2. Allow room for growth

Remember that fruit trees become quite large. Give each tree ample room for growth.

### 3. Prepare the soil

You can use the no dig method to prepare the soil. For each tree, cover an area at least 1 metre by 1 metre with 5 kg of fertilizer, 5 kg of animal manure and one-fifth of a bag of lime. Add fulvic acid, crusher dust, compost if you have it available. Cover with cardboard and a thick layer of mulch and **leave for a minimum of 6 months**. Weed regularly and replace the compost and cardboard if necessary.

When it is time to dig the hole for your new tree, you will find that the soil is easy to work. Also, by leaving the soil, micro-organisms have had time to do their work, moving the fertilizer through the soil, breaking down the organic matter into plant usable food and improving the structure of the soil with the addition of humic acid. It also ensures that your tree will have lots of nutrients to give it a great start in life.

## THE PROBLEMS WITH CONVENTIONAL STRATEGIES TO PREVENT FRUIT FLY AND OTHER PEST AND DISEASES

The things you absolutely don't want are pests, insects and disease in your garden. You'll have them until you do what is needed to provide your plants with what they need in order to be healthy.

Pests, insects and disease are your signposts that that "something is wrong" with your soil. You can spend time and effort in "eradicating" the signposts, but if you do this without also considering the reasons why you have these problems, you will be doing little more than providing a time consuming and costly band-aid. The band-aid solutions might even create problems of a more fundamental and long-term nature.

Unhealthy, unbalanced plants are susceptible to soil and leaf disease and insect attack. It is unlikely that we will ever get rid of these problems completely. We probably don't really want to because the soil food web only functions efficiently when all species are present. What we want is to achieve a balance so that the damage caused by disease, insects and weeds, is manageable and economically sustainable.

In the past we have concentrated on curing the symptoms rather than looking at the source of the problem. This is the approach used by both modern medicine and agricultural science. It is an approach that is underpinned by the fact that **there is a huge profit in treating symptoms and absolutely none is identifying the cause of the problem and eliminating it**. That is, unless you are a grower! As a grower, it is far more economically advantageous to identify the cause of the problem and tackle it at that level.

The obvious solution is to use a chemical poison to kill insects and weeds that are damaging our crop. This is the solution of last resort.

It is understood that there are potential health dangers associated with chemical residues that arise from using poisons. Government regulation exists which protects us from excessive residues. Withholding periods are enforced when crops are sprayed. The frightening situation arises when, whilst food might not be over the limit in terms of toxic residues in relation to one chemical, **that food might contain a whole cocktail of different poisons.** Hundreds of different chemicals are used in agriculture but **there is no research to evaluate the potential risk associated with combinations of poisons or the build up in the body that occurs over time when our food contains residues from chemical sprays.**

Simplistic chemical fertilisers give rise to unhealthy plants. Unhealthy plants are a target for destructive insects and disease. Genetic modification takes us to an even more dangerous level of “intervention” and it is the very same multi-nationals who sell the chemical fertilizers that are behind the genetic modification research and patents.

Monsanto has suggested that **because of Roundup-ready crops** which have been developed with genetic modification and can be sprayed with herbicides and be the only green plant still standing in the field, **sales of herbicides will triple over the next few years!**

Obviously there is a problem with additional herbicide residues on such crops. The EU has raised the legal daily limit of glyphosate (the key ingredient in Roundup) residues to 20 mg per kilogram of food. This is sixty times greater than the acceptable limits recommended by the World Health Organization. The USA has raised the legally acceptable levels

of glyphosate to 100 mg per kg of food! Meat eaters are ingesting record levels of herbicide residues as the herbicides accumulate in animal feeds like soybean hulls. Herbicides kill algae in the soil. They also kill micro-organisms in the digestive systems in the body.

In 1999, scientists at the York Nutritional Laboratory in Britain found an unusual 50% increase in allergies associated with soybean products coinciding in a major increase in imports of genetically modified soybean. Commercial bread may contain GM additives from soybeans or canola but without labelling we cannot be sure.

You have a choice. You can jump on the “if it annoys you, kill it” bandwagon. If you choose to do this, you can be sure that by the time you start to treat the symptoms, you have already lost productivity. Also the “cure” can lead to some interesting, long-term problems that you’ve not yet even considered as a possibility!

## ALTERNATIVE PREVENTION STRATEGIES

Probably the major problem associated with growing fruit, particularly stone fruit, is fruit fly. Fruit fly prevention is expensive, time consuming and requires constant vigilance.

The first thing you have to do to control fruit fly is to make sure you pick up all fruit that falls on the ground where it becomes the home for next season's fruit fly. Bury the fruit deep within a hot, potent compost mix or in a pile of animal manure or put it in the garbage bin.

Big growers net their fruit to stop attack by fruit fly. This costs thousands, even millions of dollars. You can do this on a

smaller scale by using bags of calico to cover the fruit or net your trees.

There are many lures or baits, which attract the male fruit fly and kill it. When the male mates after it has eaten the bait, it passes the poison onto the female who also dies. This method is effective but needs monitoring closely and baits needs to be put out to cover the entire orchard.

Prevention is obviously much better than cure. To understand how to prevent fruit fly attack, or indeed attack by any pest or disease, you need to know a very important principle of nature: nature's foremost object is survival of the species. Only when you recognise the validity of this will you see how obvious the solution is.

Fruit provides protection for the seed and also provides nutrients for the new plant to use when it starts to grow. Fruit falls to the ground and rots, adding nutrients to the soil where the new fruit tree will take root and grow. The job of pests and diseases is to stop **unhealthy** plants from reproducing. They are the garbage disposal experts in the natural world.

Fruit fly lay eggs in the fruit from trees lacking a full and balanced complement of nutrients. Fruit from the sick tree becomes food for fruit fly larvae rather than being the nutrient store for a newly germinating tree. Fruit flies are attracted to sick trees because the fruit produced by that tree is lower in sugar and minerals than fruit produced by healthy trees. Nutrient rich fruit and leaf sap is actually poisonous to insects because they have simple digestive systems. The sugar content of nutrient full fruits and leaves turns into alcohol and kills them.

Insects respond to a combination of scent and the infrared emissions from plants. Sick, mineral deficient plants produce a completely different emission compared with healthy plants.

These trees have a specific combination of scent and infrared energy fields, which insects home in on. The sicker the plant, the easier it is for the insect to home in on it. If your soil is balanced and at a pH of 6.4 your plants will be healthy and will not be attacked by pests and diseases.

Different insects vibrate their antennae at different frequencies to pick up the signals put out by the plants. Fruit flies vibrate at 150 to 250 cycles per second. The scent and electron frequencies emitted by trees and plants are amplified by the insects through an action of vibrating and rubbing their antennae allowing the insect to home in on plants that will provide food for the insect and a source of food for larvae which will hatch from eggs deposited by fruit fly.

If this sounds far-fetched and totally implausible an explanation, allow me to describe my observations over the past few years.

I have noticed that the tamarillos and tomatoes I grow in the areas of my garden that have a pH level approximating 6.4 do not get infected by fruit fly nor are they eaten by insects. Birds do not eat strawberries unless they become over-ripe. Cabbage, broccoli and other leafy vegetables sometimes get eaten but most often, in a row, I will find one or two plants that have been affected. These same plants are also home for snails and have obviously been eaten by some insect or other. The rest of the plants in the row will be untouched. This is an indication that there are patches of soil that are deficient in certain minerals.

White moths are far less of a problem than they used to be and the eggs that are laid on the leaves don't seem to hatch so we have very few caterpillars.

Hares used to eat newly planted trees and they occasionally nibble areas of carrots, but they are not a major problem. Scrub



turkeys don't eat anything and even when they scratch around, they seem to leave new plants to grow undamaged.

Fruit that is produced by trees that have been neglected are full of fruit fly larvae.

When we had a long period of rain and very little sunshine in the summer of 2007/8, we had an infestation of snails that attacked everything and multiplied so rapidly that I thought I would never get rid of them. I realised that this happened because, without sunshine and with constant rain, the health of the plants in the garden suffered badly. The snails multiplied rapidly to take advantage of a smorgasbord of damaged food.

The problem with most pests and diseases is that when they occur, the damage is done and little can be done to salvage what's not damaged. In my opinion it is far, far better to concentrate on getting the mineral content of the soil at a high level and balanced, to build the mineral content of the soil and to ensure an environment within the soil which will foster a large workforce of micro-organisms than to try and "manage" pest populations. If the soil is right the pests won't be a problem.

## **REVIEW EXERCISE**

### **Task 1**

If you have a camera, take photographs of what you already have. If you don't have a camera, sketch a mud map (a rough drawing that is not necessarily to scale) to show where things are. In a few years' time, it will be useful to be able to look back and see your starting point.

In the space provided below draw a mud map (a map not to scale) to show where you plan to have your garden and if you are planning to put in fruit trees, show where you will plant

them. Mark in paths and retaining walls and any other feature you plan to have. Keep in mind the things you have to take into account as you decide on the location of your vegetable and flower gardens, your compost bins, your tool and fertilizer storage area, your shrubs and fruit trees, your vines and berries.

You may even start work on the design of your water storage and watering system: pumps, sprinklers, fertigation units and pipes.

**Task 2**

Work through the following to help you highlight the major ideas contained in this module.

1. What are the benefits from using a "no dig" approach to establish a new garden?

---

---

---

---

---

2. List the ways organic matter improves soil and plant growth

---

---

---

---

---

---

---

---

---

---

---

---

3. What are some of the rules about making good compost?

---

---

---

---

---

---

---

---

4. Chemical fertilizers can be described as "speed" for soils. Why is this name appropriate?

---

---

---

---

5. What are five guidelines to ensure that newly planted trees survive and become highly productive?

---

---

---

---

---

---

---

6. What is the role of insects such as fruit fly?

---

---

---

---

---

7. What can you do to minimise the damage they do?

---

---

---

---

---

**Errors:** bottom line page 15 "Prevention is  
Page 13 (9)  
Page 13 "or net your trees."  
Page 16: survival of the species is nature's  
Page 16 "plants" not plans