The Cost-of-Living
Victory Garden

www.underthechokotree.com
Sustainable Living in the Suburbs

By Nev Sweeney

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Thanks to Marty Ware of Marty's Garden Show and Marty's Garden (YouTube) for developing the concept of the **Cost of Living Victory Garden**, putting together his own and hen sharing it with the world.

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1.0 Introduction

AUSTRALIAN WAR MEMORIAL ARTV02411

It seems that the idea of the Victory Garden was developed in North America during the first world war where they were also referred to as 'war gardens' or 'food gardens for defense'. The idea of the victory garden was so that the populace could supplement their food supply, but also to help improve morale during difficult time by carrying out positive actions. I found out about victory gardens via the documentaries about WW2 that were on the TV when I was a kid, specifically ones about the UK.

At the time I was not aware that the Australian government also supported the establishment of victory gardens during WW2 as well. This is described in the following quote from the Australian War Memorial website –

"During 1942 food shortages began to have an impact on the Australian home front. The agricultural industry was struggling with massive labour shortages, a severe and prolonged drought, and major shortfalls in imports of seed stock and fertiliser. There was a growing realisation that unless agriculture became a focus of the war effort, food shortages would be imminent.

In January 1942 the Prime Minister, John Curtin, launched "Dig for Victory", a publicity campaign urging householders throughout Australia to grow their own vegetables as a contribution to the war effort. The press loved and promoted the idea, as did industry and local community groups."

That was then, this is now, so what is the point of my raving?

While I would not suggest that our current troubles, and by troubles I mean the rising cost of living, are equivalent to a war, there are a lot of people both here in Australia and overseas who are struggling due to it. A concept was pointed out to me by a friend (Marty of Marty's Garden) that a positive response to the struggles we face would be to start a 'Cost of Living Victory Garden. Not only would it save us money and improve nutrition but also improve morale by giving us something positive to do in troubled times. Sound familiar?

I found the concept fascinating and I feel that its time has come. As a response to the idea, I have put this eBook together to give you enough information to start down the Cost-of-Living Victory garden road today.

Keep in mind there are so many other positives that you get from growing your own food -

1. It will save you money – you can actually save money by growing your own produce and the more of the process you do yourself, the more you save. Growing from seed (rather than buying in seedlings), saving and using your own seed, making and using your own compost and making your own seed raising mix can all help keep your costs down. Fruit trees are a larger investment but can pay back for many years once they are established and with the right care.

2. Growing your own provides fresher produce, improving your family's nutrition – Once a fruit or vegetable has been picked the vitamin content starts to decrease so that the older they are the poorer nutrition they provide. While we like to think that we buy only the freshest produce, there is no real way to tell how old it is at the time of sale. If you pick it from your backyard or balcony and cook it straight away or even eat it raw, you are giving yourself and your family the best nutrition available.

3. Taste - Also, there is nothing that beats the taste of fresh, home grown produce! Fresher fruit equals sweeter fruit - it has not been harvested unripe then stored for months before getting to the retailer.

4. Lower food miles – it has been calculated that a typical Australian food basket, including fruit and veg, has travelled 70,000 miles to get to you. Each of those miles consumes fossil fuels and pumps greenhouse gases into the atmosphere (and travel by air generates 177 times more greenhouse gases than shipping). If you only have to step into your backyard or onto your balcony to gather the ingredients for a feed, the travel is measured in food feet not food miles, and no fossil fuels are consumed at all!

5. No chemical residues: you know where your food comes from and that it is not contaminated by pesticides – If you grow your food organically you can be sure that there are no residual nasties waiting for you. You know what has and what hasn't been using to grow your produce so you can eat it with confidence.

6. It shows kids where their food comes from – If you have kids it can be a real eye opener for them to see that carrots, onions and potatoes actually come out of the ground and lemons come from a tree, not a supermarket. Also, getting them involved with growing the food they are going to eat is a great motivator for them to develop healthy eating choices. Years ago my kids would love it when I brought carrots in with the foliage still attached, that they could eat raw (we used to call them Bugs Bunny carrots).

7. It enables you to eat a greater variety of foods – If you source your fruit and veg from retailers, you can only buy the types and varieties of fruit and veg that they are prepared to sell you. Take tomatoes for instance, if you are lucky you may find 3 - 4 varieties in the supermarket, but there are over 200 different varieties available from heritage seed companies which you can grow. Think of all the

taste treats awaiting you out there that you don't even know about, growing your own can open up a world of taste!

8. The satisfaction which comes from growing and eating your own produce is amazing. It may be only one of two ingredients but it can transform a whole meal, and it really is special when you make a meal mainly from ingredients you have produced yourself.

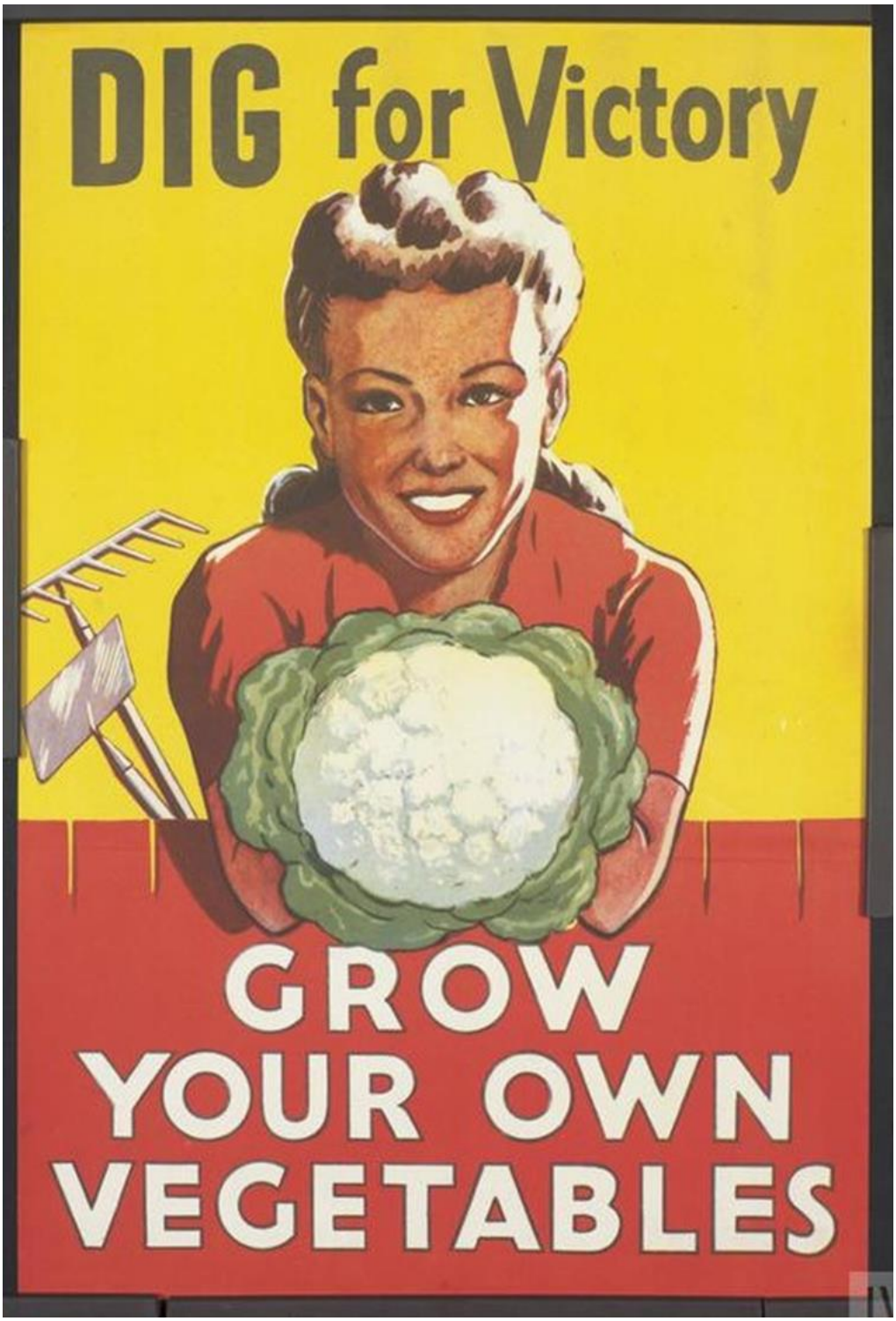
9. No packaging to try and recycle or send to landfill – Even organic produce can come packed in layers of plastic film, on a polystyrene foam tray, in a plastic bag and all of that packaging will wind up polluting the environment sooner or later. A big difference I noted when we started to get serious about producing our own food was that the amount of garbage we generated reduced significantly and the amount in our worm food/compostable bucket increased significantly.

10. Reduced environmental impact of fertiliser and pesticide use – The chemicals used in industrial agriculture have a detrimental effect on the soil, ground and surface water, biodiversity and the environment in general. By opting out of that system and growing your own (as well as buying organically grown what you can't produce yourself) you don't encourage the continued use of these damaging chemicals.

11. Resilience – When things go wrong in the world, like pandemics, wars and high cost of living, being able to produce some of our own food means we are more resilient when bad things happen.

12. Food security – The shorter the supply chain, the more secure your food supply is likely to be, and you don't get much shorter supply chain than walking into your back yard to be able to eat!

So you can see there are lots of good reasons for starting a Cost of Living Victory Garden (if you don't already have one) and you can use the information in this eBook to set about starting one today!



2.0 Where you Gonna Put it?

When you look over the area where you are thinking of placing a Cost-of-Living Victory Garden, there are a number of things that you need to consider and while none of them are deal breakers, picking the site with most of the right factors will make your journey into veggie growing easier, more pleasant and more productive. In the end, most difficulties can be fixed or at least allowed for, and your choices will be limited in an urban or suburban area so when looking for your site pick the best you can but don't worry if it isn't perfect, the important thing is to get out there and grow!

1. **Aspect** – In other words, which way does the land face, north or northeast is best, so that you get the most amount of light. This is very important in Europe, less so here in Australia with our abundant sunshine. Having said that it is possible to reduce light levels if you have plenty, less easy if you are already operating on the minimum level.

2. **Shade** – Also related to light levels, broken shade can lend itself to lettuce and strawberries, full shade can be very restricting. So where available, full sun it is!

3. **Soil type** – While you can grow almost anything in almost any soil, but the better your soil is to start with the less work you will have to do to make it productive. Generally, soil contains various percentages of sand, clay and silt. To get a rough idea what your soil is like, make a 2cm ball out of wet soil with your hand and then drop it. If it feels gritty and falls apart when it hits, it is mostly sand, if it feels greasy and slightly flattens when it hits it is mostly clay, but generally it will be somewhere in between! Sandy soil is hungry (needs nutrients and water) but is well drained, clay soil is very good nutritionally but has poor drainage. Put a calcium salt like agricultural lime or dolomite on a clay soil to break it up, and any soil will benefit from organic matter such as compost. If your soil is concrete and you don't want to dig it up, consider raised beds or container gardening. The process of testing your soil will be explored later in this eBook.

4. **Drainage** – this is how quickly water drains away when you stop adding more. In general terms a clay soil is poorly drained and sandy soils are well drained, but you might find boggy patches in low lying sections of any soil. If drainage is a problem, build a bog garden in the area or put in a pond, but if the whole of your back yard is poorly drained and your neighbours won't find it funny if you divert the water into their place, go for raised beds again.

5. **Slope** – this affects drainage and aspect, if you have steeply sloping land you might think of putting in terracing or swales, but more likely it will be a gentle slope because those are the areas we tend to build up. A gentle slope will assist in drainage and if it slopes down towards the north or northeast it will provide a better aspect.

6. **Existing plants** – If you have a yard full of tall trees (which council won't let you cut down) it makes growing veggies more difficult from the point of view of shading, but also the trees will pirate any fertility you try and put into the soil to grow veggies. Again, raised beds on an impervious base or use of containers may be the answer. On the other hand if the land is growing a good crop of "weeds" or grass that is a good indication of a well drained, fertile soil.

7. **Access** – The easier it is to get to your veggies the more likely it is that you will take the time to wander down there and, weed, pick, mulch or generally lie down amongst them. If you have a big yard, you still might want to site the veggie patch close to the back door of the house to make access easier for yourself.

Remember, don't be too despondent if your site isn't ideal, almost any problem can be fixed or at least compensated for by the varieties of vegetables you grow.

All sites will suffer from one or a number of problems and unless you are looking to supply your local fruit and vegetable shop year around, you will be able to work out a compromise and produce some food in almost any area.

When you do go looking for your first (hopefully first of many) place to grow, don't fixate on the back yard, there are many other opportunities for setting up places to grow food –

The front yard – we have two wicking beds growing perennial as well as annual vegetables, our herb spiral, the banana circle and ten fruit trees in our front yard. We have never had a problem with pilferage. It is a sad fact that much of what you can grow in your front yard will not be recognised as food by the general public so it will probably be safe. On the plus side growing food in your front yard may produce opportunities to make friends and discuss urban food growing with your friends, neighbours or even passersby.

Patios, decks or Balconies – depending on their aspect and how much sun they receive can be a good place to site veggie boxes, wicking boxes or self-watering containers to grow fruit and veggies in. Even standard pots and planters can produce food with a little bit of effort and because they will be close to the house, they will be quick and easy to harvest. You do need to check that the structures will support the weight of the pot, growing medium and plants but in most cases, you should have no problems with a few Styrofoam veggie boxes.

Roofs – the flat roof of sheds or garages can be used as growing spaces too with the same things to look out for as patios, decks and balconies above. One way of using the extra space afforded by a roof is to build a no-dig garden which is lighter than conventional gardens for the same volume or a hydroponic set up could also be considered. One point worth noting is that there should be no drainage allowed from the growing container onto the roof if you plan to use the roof as a catchment for rainwater.

Window Boxes/Sills - While somewhat out of fashion a window box, either home produced or bought can be used to grow herbs or vegetables, depending on the light available. On the inside of the window, small self watering pots can be placed on the window sill and used to grow small vegetables, greens or herbs.

Inside the House – If you have a flat surface inside that gets a few hours of sun a day you can use it to grow Microgreens and even if you have areas that don't get any sun at all you can still grow sprouts or mushrooms.

Your Families', Friends' or Neighbours Yard – Even if you live in a flat with only one window that gets no direct sun at any time during the day, you can canvas your nearest and dearest or even those less near and dear to lend you growing space in their yard. Ideally within walking distance of your place of residence, land owned by others can be used by you to produce food for yourself, with a percentage donated to the land owner in lieu of rent. If you can get access to land owned by others you will still be producing food in the city or suburbs as well as developing your growing skills and improving your nutrition.

Allotments and Community Gardens – There may be land available in your area for nominal rent or for work done on the site in allotments, generally run by the local government or community gardens which may be run privately by members or by local government bodies as well. If you have no land or growing space on offer, contact your local council and see what is available in your area.

Before leaving the process of selecting your Victory Garden site, we do need to talk a little bit about how big the veggie patch should be. If you haven't grown vegetables before it is best to start off with a small space and work up, a small space worked effectively is much more productive than the larger one let go because it takes too much to keep up with. While I do have issues with those enthusiastic garden writers who declare "it is possible to grow all the vegetables for a family of 4 in a 3metre by 3metre square" (all I can say is that they must eat out a lot!) with care and planning you can grow a proportion of your veggies even in a flat.

The beds are best kept 1metre to 1.2 metres wide so that you can get to all parts by leaning across them and not have to walk on the beds themselves, because this causes soil compaction, reducing the amount of air in the soil and causing poor drainage.
We currently have about 35 square metres of veggie beds and they provide food (in a larger or smaller amount) almost every day of the year.

So after looking at all of these points and deciding roughly where would be best to put in your veggie bed(s) and how big they should be, it is time for a bit of planning.

3.0 Planning

Any plan will be very family specific because only you know which vegetables your family eats how much of each one you need. If you have the patience, make a list of the veggies you eat and then make a note of how much you buy of each type over a year. If you are not that pedantic (like me!) then just talk it over with your family and wing it. Also, don't be afraid to try new stuff, there is a wide range of veggies available that you don't see in the shops, so start out small and discover some new family favourites. Working out what types of vegetables your family eats, at least to start with, will give you an idea of the sorts of vegetables you will want to grow.

3.1 Veggies to Consider Including in Your Plan

Good yield for space used:

Broad beans	Broccoli (Sprouting)	Onions
Runner beans	Carrot	Tomatoes
Dwarf beans	Lettuce	Silver beet
Beetroot	Zucchini (squash)	Snow peas

Easy to grow:

Broad beans	Silver beet	Onions
Runner beans	Spinach	Kale
Dwarf beans	Turnips	Snow Peas
Beetroot	Lettuce	
Carrot	Radishes	

Tolerate some shade

Beetroot	Salsify	Celery
Kohl Rabi	Radish	Spinach
Turnips	Cabbage	Silver beet
Carrot	Brussels sprouts	Lettuce
Parsnips	Cauliflower	

3.2 Ideas for Getting the Most from a Small Veg Garden

One of the constant challenges of urban/suburban food growing is that we have very limited land on which to grow and that has to fight with other needs like recreation. We have a total block size of about 600m2 but only 300m2 in the back yard, not taking into account the land taken up by sheds and the greenhouse so like farmers the world over, we always want more land. I do appreciate though that there will be urban farmers out there whose mouths will water at the thought of a 600m2 block so the trick is to make the best of what you have got. To help you out as to how you might do that here are some ideas –

Develop a plan – Assess the resources you have for food growing and compare them to the strategies listed here. Some will work for you, some won't and some you may need to trial to find out. Develop a plan which helps you get your head around what you are trying to do and makes sense to you, such a plan may include –

- A sketch of your growing area showing what structures/plants are there now and what you intend to change to increase your productivity.
- A succession plan of what to sow/plant out to keep production up.
- Designs or sketches for things you need to build (cold frame, mini-greenhouse, trellises or compost bin etc).
- An action plan of who is responsible for doing what, when

By recording your plan on paper or electronically you will be able to keep track of your progress and record your successes and failures.

Aspect – The way your veggie growing area faces can have a great bearing on how much you produce. The best aspect is north around to northeast and if your growing area faces south and gets no sun you will have problems. If you have a choice go for the best aspect that you can. It is possible to grow crops which can cope with a lower amount of light (generally leaf crops) or use mirrors to deflect sunlight towards your

plants but the better your aspect is to start, the easier your veggie growing adventures will be.

Think Vertical – many varieties of vegetables and fruits can climb such as beans, cucumber, chokoes, peas, or be trained upward such as tomatoes or even pumpkins. In the 2011 season we got the best harvest of huge pumpkins ever by growing them across the back fence. So maximise your horizontal space by growing vertically against any vertical surface you can, by building free standing trellises, by growing up established trees or even using growing veggies as a living trellis eg by growing beans up corn stems. You can even put some growing medium in a large pot next to a structure and grow fruiting vines like squash or pumpkin up over the roof. More information about vertical growing techniques is available in our eBook about growing veggies vertically – Upwardly Mobile with Vertical Veg

Use succession planting (Stack in Time) – This doesn't give you more growing space, but allows you to get more out of the growing space you have and is, simply put, replacing any vegetable harvested with another one straight away. To make this work you have to be right on top of maintaining your fertility, have a great plan and be constantly sowing so you have seedlings ready. A detailed article on succession planting is available in a later section of this eBook.

Don't plant too much of one thing – getting the most out of your growing area means only planting just enough of any one vegetable for day-to-day consumption. Otherwise, you get a whole stack of one crop and need to reserve it somehow, but still have to buy in the rest of your veggies. A good plan will make sure that this doesn't happen.

Interplant where possible – rather than growing long rows of the same crop with blank space in between, plant out the whole bed with all sorts of different veggies grown together. You can plant so that all the veggies ripen over a period of time so that the beds are producing for a longer period and, again, a good plan will support this and make it easier for you. Intercropping can confuse pests, reduce the amount of bare ground and increase the amount of produce per square metre of garden. This will

require ignoring the spacing recommendations on the seed packets and some of the gardening books but a well maintained organic garden will have the fertility to cope with it. We plant so that the veggies grow within about 30cm of each other. Note: This will not work for corn, which needs to be planted in a block to pollinate correctly.

Be prepared to experiment with unusual vegetables or varieties – One of the fun bits of growing your own is growing and trying new veggies and new varieties. Get hold of as many seed catalogues as you can manager and spend some time reading through and taking note of what will grow in your climate, how long it takes to get a harvest and how early or late in the year each variety grows. This can spread the harvest and perhaps by trying some new types of veggies, allow you to exploit slow times in the veggie growing year when you may otherwise strike a "hungry gap". We have tried new stuff that we have not been used to eating like Jerusalem artichokes, Asian greens, leeks and broad beans and found the greater variety is good for the garden and good for the cook. There is hardly a day when we can't go out to the garden and harvest something. Try a small amount at a time and then if they are good, add them to your plan if not at least you tried.

Consider perennial vegetable beds – Perennial veggies are the parts of plants which are harvested and eaten like vegetables and where the parent plant lives for more than two years eg asparagus, Jerusalem artichokes, chokoes, Malabar spinach and taro. Generally we tend to eat rather more annual vegetables than perennials and so annual vegetables are the type that make up the bulk of our veggie patches. While some perennials like asparagus and artichokes are available only for a short season, others like shallots and rhubarb crop for extended periods. There should be a place in everyone's veggie growing efforts for perennials.

Try medium/small varieties of vegetables – during your seed catalogue research keep your eye out for dwarf varieties and small types of vegetables that allow you to get more vegetable from the same space, like planting bush cucumbers or pumpkins rather than runners, sugarloaf cabbage rather than drumhead types or Cherrytime capsicum rather than the larger Californian wonder.

Make a place for containers – There will always be some extra space where you can fit in the odd veggie box or self-watering container so if your do take advantage of some unused space don't forget to add that into your plan so you can manage the extra space effectively. They can also be built to be self-watering, making them water efficient and reducing the time require to keep them watered. This will be expanded on a bit later in this eBook, but for much more detail, consider downloading our eBook on growing food in containers – Growing Food Crops in Pots

Make initial thick sowings – work especially well for root crops like carrot or beetroot seeing as these need to be sown where they are going to grow (they don't take well to transplanting) sow thickly and then thin out as they grow, eating the thinning as baby vegetables. Some leaf crops like lettuce can be used in a similar way.

Indeterminate vs determinate veggies - a few vegetables, such as tomatoes, peas and beans contain varieties within their ranks that will grow, mature and be harvested within a specified time and a defined plant size. These are referred to as having a determinate growth habit, also referred to as "bush" or "dwarf" varieties whereas other varieties of the same plant may continue to grow throughout the season. These

varieties are referred to as indeterminate, also referred to as “climbing” or “staking” varieties and these will produce for as long as the soil and climatic conditions will allow. Determinate plants are more likely to give you a single major harvest then little or nothing while the indeterminates will spread the harvest out providing less at any one time but spreading the harvest out to give you more produce over the growing season.

Stacking in space – Rather than growing a single crop at one level, “stacking” your veggies allows you to maximise your productivity for a given area of land by growing productive species at several levels. A great example of this is the “3 sisters” guild of the Native Americans. They would grow corn (an upright crop) and once it was underway plant climbing beans to grow up the corn (providing nitrogen to the other plants) and squash to grow over the ground and act as a living mulch. So rather than just harvest corn from a plot of land they got three crops: Corn, beans and squash, thus tripling their productivity for no increase in growing space.

Use cut-and-come-again veggies – If you grow a cauliflower, as nice as it will be to eat, once you have harvested it the growing space will be non-productive, require replanting and will take some time before it is harvestable again. If you plant vegetables which can provide an extended harvest period by re-growing after partial harvest this will increase your overall productivity. Cut and come again veggies include Asian greens (mizuna, mibuna, tatsoi) non-heading lettuce eg oakleaf, celery, silver beet, spinach and broccoli will produce side shoots after the main head is harvested.

Use fruiting veggies – In the same way as cut-and-come-again veggies extend your harvest, some veggies which produce fruit such as solanum (capsicum, tomato and eggplant) and cucurbits (squash, cucumber, zucchini, cucumber) continue to produce throughout the growing season. A zucchini planted in early spring and another in mid summer can keep you in zucchinis for most of the frost-free part of your growing season.

Consider sprouts and/or microgreens – these two techniques are a no-land, low cost, high yield way to grow veggies. To grow sprouts the simplest way is to soak some

suitable seeds in a container, drain. Rinse and drain again. Then rinse and drain twice a day for a week or so after which your sprouts are ready to harvest. Microgreens are a bit more complicated but basically, the seeds are germinated in a container of potting mix, then grown up to the four leaf stage at which point they are harvested with scissors. Detailed instructions about producing sprouts and microgreens are available in our eBook, which is accessible via this link – Growing Sprouts and Microgreens

Install a Straw Bale Garden – This is a quick and easy method to start a raised veggie garden and works by putting chook manure on hay or straw bales resting on the ground then watering them well and keeping them wet. Let them breakdown for a couple of weeks and then plant veggies into compost on the top of the bale. As the bale breaks down it supplies nutrients to the veggies and keeps them growing well.

Install wicking bed – wicking beds can be built in all shapes and sizes. These consist of a lower water reservoir filled with gravel to support an upper layer of growing medium. The bed works by keeping the reservoir filled with water (through filler tubes put in during construction) which then "wicks" up into the growing medium by capillary action. The wicking process ensures that the plant always has access to water but as little is lost via evaporation as possible.

Exploit non-traditional growing spaces – If you are thinking of growing vegetables in your back yard, but don't have much room, there are other places which can be used to grow food which you may not have considered –

- Front yard and road verge at the front of your house
- Front yard/back yard of friends, neighbours or relatives (with or without produce sharing)
- Suitably reinforced flat roofs of sheds etc.
- Local community gardens
- Local schools or other institutions (with permission of course)
- Guerrilla gardening of local vacant lots or other waste ground

Extend the season – by the construction of microclimates (where this is feasible) you can sometimes extend the growing season so that you can plant somewhat earlier and harvest somewhat later than is usually possible. Covering crops with a lightweight fabric (so-called floating row cover) can keep temperatures up and ward off frost also avoid planting frost sensitive crops so that they will run into a time when frost is likely.

Consider Irrigation – one of the limiting factors, particularly for growing food in containers is ensure that the plants get enough water to grow well, particularly in hot weather. This can be especially important where growing in containers is concerned. At the planning stage it is worth including in some plans for getting water to your plants. Self-watering containers and wicking beds are good, and clay pot irrigation works well when beds in the ground are used but consideration to a low cost irrigation system may

be worthwhile also. More information on low tech irrigation techniques can be found in our eBook: Low Cost, High Efficiency Irrigation,

It is unlikely that all of these techniques will suit your particular circumstances, but you can just about guarantee that at least a few will. Some, like starting out with a plan, will be good advice for anyone wanting to grow their own food in a small area. As part of your planning process, decide on a couple of these techniques which you consider most likely to work for you, put your plan together, then get out there and PLANT! Oh, and good luck!

4.0 Setting Up Your Cost-of-Living Victory Garden

4.1 Double Digging

Without the rotary hoe it was time to use a bit of appropriate technology……. A spade and a garden fork, I was going to double dig! One word on tools before getting on to the mechanics of this process, there are times when you can get away with skimping a bit on the cost of your tools, this isn't one of them. Only buy high quality garden tools that can take the pressure put on them by regular double digging eg Cyclone tools, the cheapie imports will fail very early in the process and require replacement – not very sustainable!

When double digging you mark out the area of the bed, and dig out a trench one spit (spade length) deep and wide the full width of the bed, place the soil into a wheelbarrow. Then, using the garden fork, open up the soil at the bottom of the trench so it is loose and will admit water, air and plant roots and add some compost or well-rotted manure. The fill in the trench by digging another trench next to it, loosen the bottom with the fork and add manure or compost, then full it in with the soil next to it. Continue this process until you have a trench left at the far end of the bed and fill this in with the soil form the first digging in the wheelbarrow. The result is a vegetable bed that bulges above the previous soil level with improved aeration and drainage and natural fertilizer already incorporated.

If you are going to cultivate, the double dig method has much to recommend it.

- The soil depth for roots is increased
- The whole bed is aerated and drainage is improved
- The compost/manure is where it's needed – in the root zone.
- No fumes or noise, just good exercise
- The soil organisms are treated a bit more kindly.

The downside is – ignore what I said above about good exercise, it's hard work! Even

with press ganging my son-in-law to help it is slow and it is hard work. If you like to dig (and I know that there are hardy souls out there who do) then double digging is the way forward for you. But if you (like me) prefer the easy way, there is a better solution!

4.2 Sheet mulching

If digging isn't your bag, sheet mulching is a great way to start out your adventure with the Cost-of-Living Victory Garden.

The sheet mulch can go straight over grass, weeds or bare earth and will ensure a bountiful harvest once it starts to break down. You can also sheet mulch almost any sized area if you have the materials and a few willing hands to help.

The idea is to create a barrier between what is currently growing in the area and what you will be wanting to grow and then put down several layers which will decompose down to form a fertile growing medium and then a protective mulch layer on the top to keep the moisture in.

The Barrier

The barrier is designed so that it will eventually break down, but only after the plants underneath have died from lack of light and frustration in general. The two materials of choice are cardboard or newspaper. If using cardboard, the large sheets used to make packaging for appliances and other large boxes work very well, but having said that, used fruit or veggie cartons are also OK. Make sure that you don't use waxed veggie cartons, however because they will not break down due to the wax coating. One layer of cardboard is usually enough.

If newspaper is to be used this can usually be gotten free or at very small cost in the form of unsold papers form your friendly local newsagent or get friends and family to save them up for you rather than putting them in the recycling bin. If you are using newspaper a good thickness is required, so open the paper out flat and use the whole thickness of the paper, overlapping them by 100mm or so to reduce the likelihood of those pesky weeds threading their way through.

It is a good idea to soak the papers for a while before laying them down; it has several advantages. Wet newspapers will not fly all around you and your neighbour's yard if the wind picks up and they will be easier to breakdown and feed the soil bugs. An

alternative method is to lay the papers down and give them a good soaking with the hose but soaking the papers in a wheelbarrow full of water for a few hours before laying them is the better way to go.

The Main Course

Anything organic can go in the middle bit but you need a layer somewhere around 200mm – 250mm thick. Unless you live on a farm and a while stack of organic matter floating around it is highly likely you will need to buy the material(s) for this layer. I use Lucerne hay because it has a higher nitrogen content than straw (but also is more expensive). Both hay and straw will expand out once taken out of their bale and if you are using straw, adding some high nitrogen manure such as chook poo while you are laying the straw down. This will help the mainly carbonaceous straw to break down into a fertile growing medium by providing some nitrogen for the bugs to eat as well.

In either case (straw or hay) you will need to wet it as you spread it out on your barrier layer, otherwise it will take an age to break down. You want it to be as wet as a sponge that has been just rung out, that is to say moist but not dripping. Last time I put down some sheet mulch I did not wet the Lucerne down, I ran out of time but it rained heavily that night, which worked pretty well.

The next layer should be 25mm – 50mm of compost. This provides more nutrients and just as importantly lots of beneficial bacteria and other microbes to help the bulky layer below it decompose into a fertile growing medium. It also provides a layer to plant into if you want to get things growing right away. The best compost is home-made compost but this process can require quite a bit of compost so you may need to make a special load (difficult to do if you on a small block) or buy some in.

The Topping

If you are using hay, straw or any of the other bulk organic materials in your main course there is a possibility that they may include some seeds, which of course will become weeds. Wheat straw, cheap as it is, will definitely have at least wheat seeds within it from ears of wheat which the harvester has missed. To prevent these from germinating a 25mm – 50mm covering of seed-free mulch is needed as a topping.

I used sugar cane mulch because it is weed free and relatively cheap for what you get (it's like the 4th dimension – the stuff just keeps expanding!). You could also use wood shavings, rice hulls or dry leaves if you can get enough.

Planting Out

If you can leave your new creation for a week or three for breakdown to commence that is a good thing, but if (like me) you are too impatient it will still work out OK. Seeds can get lost in the layers so starting out with seedlings is best. Plant them into the compost layer through the weed free topping. For larger plants make pocket into the bulk layer and line it with soil or compost, then plant into that.

An application of sheet mulch may take 6 months to rot down and really get things going and should provide several years of fertility, but you can top it up with more compost etc. when needed to keep it percolating along.

4.3 Raised beds

Raised beds are great to use for a Cost-of-Living Victory Garden, especially if –

- You don't have access to soil but do have a flat area to grow on, or
- Your soil is one of the three c's (contaminated, concrete or crap!)

Following are a couple of ways you can put a raised bed garden together.

4.3.1 Standard Raised Bed

First off, I got hold of some timbers to make a 30cm high raised bed. It was a commercially available veggie bed "kit" based on timber preserved with Alkaline copper quaternary (not CCA – copper, chrome, arsenic) which is safe to grow food in. I put it together and placed it on the grass where I wanted it to go. To prevent the grass growing through I put a thick layer of newspaper underneath and placed bed so that the newspaper projected under the timber frame.

On top of the newspaper I laid down some "biscuits" of Lucerne hay. When hay or straw is harvested the machine makes the bales by compressing the plant material into sections. When the restraining blue string is cut the plant materials comes away from the rest of the bale and are generally called (around here at least) biscuits. I placed two

layers of Lucerne hay biscuits over the paper on the inside of the assembled bed, so in other words I did not pull the hay apart of fluff it up, I left it densely packed. I gave both layers a good watering to make sure that they were thoroughly wet. This speeds decomposition which makes the nutrients in the hay available to the insectary plants.

With the Lucerne in place, I did a similar thing with some straw bales which had been given to me by a friend. That almost filled up the bed and I gave the straw a thorough watering as well. The remaining 25 – 50mm between the top of the straw and the top

of the bed I filled with compost and then gave it one more good watering. After the bed was finished, I left it for a few weeks for decomposition to commence. It was winter so it would take a while to break down in the cooler weather as well as the fact that the seeds for the insectary plants could not be planted until spring.

This particular raised bed was designed as an insectary bed to provide food for and to attract beneficial insects, but the process is the same regardless of what you want to grow in it.

4.3.2 Hugelkulture Raised Bed

Essentially, growing using hugelkultur is a process whereby logs, branches and twigs are mounded up starting with the largest diameter material on the bottom working up to and finishing with the smaller diameter stuff at the top. The mound is then covered in earth and allowed to breakdown a bit, then planted out with vegetables, herbs or whatever.

The advantages of a hugelkulture approach are that –

- All that woody material absorbs water and holds onto it, making available to the plants over time, hence the techniques is very water efficient.
- As the woody material breaks down it releases nutrients into the soil, increasing soil fertility.
- Due to the fact that the material is hilled up, the hugelkulture bed has good drainage.

- It enables you to use biomass from your site (or gathered off site if you don't have any at your own site) which might be difficult to use in another way.

A good size to start with when building a hugelkultur bed is two metres long by one metre wide but I really didn't have that space hanging around in any area where it made sense, but I have read of people making a standard raised bed using hugelkulture techniques and I thought I would give that a go. Thus, it is sort of hugelkulture but not really.

My original intention was to build a third raised bed in the front yard between the two existing ones and in front of the herb spiral, but this would have required buying in the structure to build the sides of the bed. Linda, with inescapable logic, pointed out that it would be better to convert the southern side raised bed which was originally built as a wicking bed but was never successful. It wasn't successful because it wasn't tall enough and rather than the water reservoir and growing area being 300mm deep each, they were only 150mm deep. It was an idea I wanted to try which turned out not to be a good one!

To convert it I first needed to remove the current incumbents, being some rhubarb plants, a few shallots and a feverfew plant then dig out the growing medium it

contained and toss it onto a tarp so it wouldn't get away. It took a while with shovel, and hands, to remove it all but it was eventually done. I left the original builder's plastic which formed the wicking bed reservoir in place to frustrate any weeds coming up from below, but the shovel made a few cuts in it, guaranteeing drainage.

While digging out the soil from the inside I had loosened a couple of timbers by using the sides as a leverage point for the shovel, bad idea! I inspected all sides and found a few loose timbers so I went around with my drill and some screws to shore up a couple of the corners. All in all the sides were in pretty good nick structurally but a few of the original screws had rusted away to virtually nothing, and with them replaced we were ready to go!

The next trick of course was to fill the woody material that I had into the raised bed. The general rule is to start with the big stuff and then work your way up to the finer material so that is what I did. Most of it had been harvested from the (very vigorous) mulberry tree in our front yard. This material would usually be either left until the following winter for burning or taken off site for composting. In this case I could use it immediately on our own site!

After each layer of material goes in, it should be thoroughly wetted down to ensure that it is soaked through as much as possible to assist the commencement of the biomass breaking down.

Once all of the woody material has been added and wet down there is a need to add some nitrogen. The woody material will commence breaking down but as it does so the bugs doing the breaking will get their carbon from the woody material, but to balance it out will need nitrogen and they get this from the surrounding soil, making unavailable to plants. To counter this I added a few double handfuls of rooster booster, not having any spare chook manure or other high nitrogen material floating around.

Once I had applied the rooster booster, I shovelled back in all the growing material I had removed and then, because the bed was still not full, I added a bag of commercial compost and of potting mix, watering everything down well after addition. In this case the watering down rehydrates the growing medium, but also washes it down into any empty spaces between the woody material, allowing for a more uniform break down and no empty spaces to cause problems for plant roots.

I completed the process by adding a good 50mm – 75mm of sugar cane mulch to act as a……. mulch!

With the hugel bed complete I replanted the original inhabitants, as well as a stack of Egyptian walking onions given to me by a friend. My original plan was to prune all but two of the leaves off each of the rhubarb plants but I quickly found out that the root loss caused by the removal and replanting meant that the plants were only transpiring enough water to keep one leaf turgid, so I pruned the limp leaf of each plant, leaving one only.

With the bed now complete it is just a case of keeping it moist so the plants can re-establish and the bugs can start to feast on the woody material!

Note: Here is the bed 6 weeks later. It is thriving, although we did get a 40^0C day a short while back which knocked the rhubarb back somewhat!

5.0 Container Growing

If space where you want to grow your cost-of-living Victory Garden is limited or if you live in a flat, unit or townhouse it is still possible to produce some food by growing vegetables in containers. My brother grew tomatoes, onions, lettuce, silver beet, broccoli and cabbage on the balcony of a one-bedroom flat in Cabramatta. His main problem was lack of sunlight due to the position of his flat on the block. If you have any reasonable access to direct sunlight, you can grow vegies. My daughter and son-in-law also grow veggies in the miniscule back yard of their townhouse in Emu Plains. They grow lettuce, tomatoes, herbs, onions and even watermelon, all in homemade containers.

The Containers

There are many containers that can be used to grow vegies, the main considerations in their design are –

1. The container should be deep enough for the crop to be grown, preferably 20 centimetres minimum.

2. It should be strong enough to hold the mass of soil, water and vegetables and not fall apart. Needless to say it must also withstand being regularly watered so waxed veggie cartons won't work but polystyrene foam ones will.

3. There should be holes in the bottom to allow drainage. Although self-watering containers called Earth Boxes can be made that will allow water to be added to a reservoir which keeps the soil moist and the veggies happy. Earth Boxes are the subject of another article.

Some examples of potential veggie planters (some requiring drainage holes to be drilled) are –

-Plant pots, preferably 14 cm in diameter or larger.
-20 litre steel or plastic drums.

-Home made wooden boxes, or any other wooden boxes for that matter.

-Empty food tins.

-Garbage bins, plastic ones are lighter, cheaper, won't rust and will absorb some heat from the sun (Good in winter, bad in summer).

-buckets

The Soil

The soil used for container growing must retain moisture while being well drained and be fertile, if you don't want to have to keep feeding your plants with fertilizer. To obtain the best results any old soil is not good enough. Rich, friable garden soil is a good base though, to which coarse sand and compost can be added. Try mixing together one part each but experiment to find the best mix for your situation. Other additives available from nurseries such as perlite for drainage and aeration or vermiculite for water retention can be incorporated as required. Cocopeat (horticultural coir) also helps with water retention and keeps the soil friable and free draining too.

If after all this effort, you do need to feed your vegies to get the best out of them , the best way is with small regular additions of liquid manure. Liquid manure is made by soaking chook, sheep, horse or cow manure (or a mixture) in a hessian bag in water for a couple of weeks in a closed container (think of it as an enormous tea bag!). The

resulting brew is then diluted to the colour of weak tea, and then applied to the plants in your container garden and watered in . As previously mentioned the rule is : a little and often .

The Vegies

Most vegies can be grown in containers and half a dozen two metre high corn stalks on your balcony could look very decorative, but some varieties put up with it better than others . As far as possible only open pollinated (ie non-hybrid) varieties should be used otherwise you cannot grow from your own seed. Following are vegetables and varieties suitable to container growing.

CABBAGE - Earliball ; Sugar Loaf ; Golden Acre
CAPSICUM - Most varieties can be grown in containers and are non-hybrid.
CARROT - Baby carrots are most suitable eg. Baby Pak , Baby , Amsterdam Forcing or Thumbelina.
CHILLI - As for capsicum .
CUCUMBER - Bush varieties eg. Spacemaster
EGG PLANT - Most varieties eg. Short Tom or Long Purple.
LETTUCE - Cos eg Romaine or Cos Green
- Butter Head eg Buttercrunch or Green Mignonette

ONION - Any spring onion (shallot) variety.

PUMPKIN - Bush pumpkin eg Golden Nugget or Bush Butternut.

RADISH - All varieties are OK.

SILVERBEET - Fordhook Giant

SUMMER SQUASH - Bush varieties such as Early White Bush or Marrow , long white

TOMATOES - Small bush varieties eg Tiny Tim or Small Fry and "Egg" Tomatoes eg Roma.

ASIAN VEGETABLES - Many of these also lend themselves to container gardening for example Adzuki Beans; Pak Choi; Chinese Mustard; Mizuna; Mibuna and Chinese Broccoli.

5.1 Making a self-watering container

Growing veggies in containers is a good way of growing your own food if you are pushed for space, don't own where you are living and may need to move or have difficulties with the planting, cultivating and harvesting at ground level. Container growing has a lot to recommend it, but it also has a downside in that the containers will dry out much more quickly than veggies in the ground, one hot afternoon and they are wilt city!

So what is the answer? The self-watering container, originally marketed in the US as an Earth Box and now available in Aus, but you can also make them yourself. In principle, they are a container with a layer of growing medium on top and a water reservoir in the bottom and a structure that allows the growing medium to contact the water and wick it up to the plants in the growing medium by capillary action.

A good container to start with are those rectangular storage containers on wheels, you can buy them almost anywhere these days, I used ones 542mm long x 310mm high x 385 mm wide , 280mm high from bottom of growing chamber to top of rim and a volume of 55 litres. It is best to get the opaque ones made of black or dark blue plastic rather than the clear ones which suffer horribly from degradation due to the sun's ultraviolet light. The clear ones will turn very brittle in about 12 months whereas the

black ones I used have been in use in the back yard for over 5 years and show no signs of falling apart.

To make a self watering container I followed the process below and got to the point where it only took me an hour to whip one up –

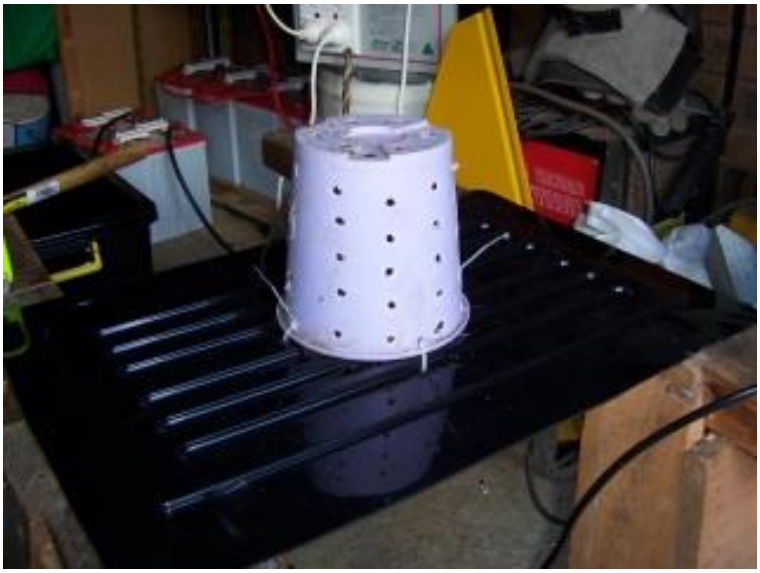
1.Cut out the inner part of the lid to form the base of the growing chamber – use a jig saw by drilling a 6 mm hole and inserting the blade or starting the saw on an angle and slowly bringing the saw blade down into contact with the plastic. As you cut the rim off, stay as close to the outer rim as you can and when you are finished retain both parts.

Note: This process is noisy as buggery so wear hearing protection at all times when using the jig saw and where there is any chance of flying materials always wear eye protection.

2.Use a Stanley knife or equivalent to trim off any plastic waste from the base.
3.Select the flower pot that you are going to use as your capillary well, one about 125 +/- 5mm is a good size. To allow water access to the material in the pot it needs to be perforated. This may be done by a drill, but it is probably quicker to use a pad punch and a hammer with the pot placed over a piece of scrap timber secured in a vice. The holes should be around 6mm in diameter and placed in rows up and down the pot.

4.Measure the diameter of the pot and mark a circle slightly smaller than the pot (say about 2cm smaller than the pot diameter) using a pair of dividers on the top of the base that you just cut out.

5.Drill a 6mm or so hole just inside the scribed line, insert the jigsaw blade and cut out the scribed circle. It is important to be aware of what you are cutting onto…….if the saw gets hard to push you may be disfiguring your table or saw horses. (I'm speaking from experience here!)

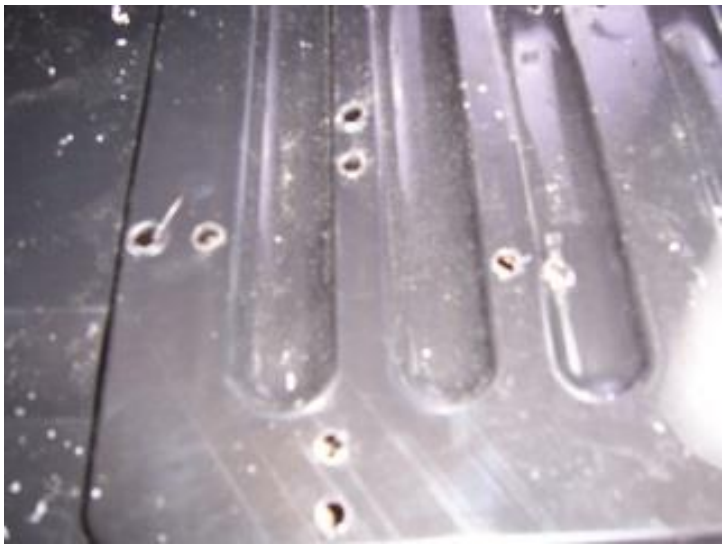


6.Drill or punch four holes equidistant from each other around the top of the pot. Place the pot top down on the base and over the hole you just cut out. It should be resting on the surface that will become the underside of the base. Drill four 6 mm holes in the base so that they line up with the holes in the top of the pot. Attach the pot to the base using four cable ties (I used 100mm x 2.5 mm cable ties, you will need 20 for each earth box you plan to build.) and then using side cutters, cut off the end of the cable ties.

7.It's now time to attach the supports so that the base that will support the growing medium won't wind up filling the water reservoir. I used 80mm diameter PVC pipe, because that is what I had but other things, even more pots if they are the same height, could be used.

8.Measure the height of the pot and then cut off 4 lengths the PVC pipe, I found a little band saw works very well for this but there is no reason why a hand saw would not do as good a job.

9.Drill the 4 equidistant 6mm holes again, around 6mm from one end of the cut pipe and then place the pipe on the base and drill a corresponding hole in the base and attach each piece of pipe with the cable ties. The base should now sit in the box and be stable. You should now drill a series of holes, say 6mm (1/4") throught the base to allow transfer of oxygen and rainwater to drain into the reservoir below, I drilled them around the perimeter of the base and between each of the stiffening ribs.



10.In one corner of the base drill a 25mm hole using a speed bit or auger to fit the 25mm outside diameter plastic filler tube. Cut a length of tube so that when the tube is resting on the bottom of the box, it protrudes 25mm or so above the top of the box. Then chamfer the lower end of the filler tube so that one side is cut away, allowing water to be run into the bottom part of the box as needed.

11.Place the base into the box and drill two drain holes (around 6mm diameter is fine), one in the middle of each of the long sides of the box just below the level of the base,

the idea being that when the water reservoir in the bottom is full, it will announce this fact by spurting water out of the drain holes.

12.The box is now ready to assemble by placing the base into the box and filling the top section of the box with potting mix, planting the veggies and then putting mulch on top.

Normal hay, straw or other organic mulch can be used or black plastic may also be used by putting it on top of the box then re-fitting the rim of the cut-out lid and making cross cuts in the plastic where each of the plants is to go. The black plastic will maximise solar heat in winter and keep weeds down but will not break down and add fertility to the box.

Almost any veggie can be planted in the completed box – a half a dozen brassicas, or eight lettuces, or a dozen shallots or you could fill it with herbs, the possibilities are endless. This year we grew ginger in one and had the best ginger crop ever!

You can also put liquid manure into the water that you fill the reservoirs with to water and feed your veggies at the same time. To fill the reservoir I just run a stream of water from the hose into the filler nozzle until water gushes out the holes in the side, or top them up with a watering can and with a full reservoir you don't have to worry about going away for the weekend or a week.

Self-Watering Container Update

The self-watering containers are still working well in our backyard, almost fifteen or so years since I put them together, and I thought I would mention what I have learned in the interim –

- Leave the plastic mulch off! It only cuts down on oxygen transfer between the atmosphere and the soil. Regular organic mulch works much better in the long run.
- Unless you have intentions on pulling things to bits regularly, cable tying everything together is not necessary. It can help to keep the central pot in place, but if you get a pot with a lip and then cut the hole so it is a bit smaller than the lip, it will support itself.
- Just to re-iterate – you really do need the black containers, preferably labelled as shock resistant or some-such. I was reading a garden book the other day where they talked about making these self-watering containers, but the pictures were of the translucent ones. Seems to me they had written the book form a theoretical rather than a practical experience perspective. (just sayin')

5.2 Box Fulla Veggies

In your Cost-of-Living Victory Garden, you can grow a load of seriously tasty veggies in a

recycled polystyrene veggie carton, and some soil and stuff of course! Why a recycled polystyrene veggie carton? They are a good size, readily available quite often for free and they are light and easy to move around so it makes sense to use polystyrene boxes if you can get hold of them.

Reasons why you might want to make one of these little white marvels include –

- A veggie box is a good way to start small if you are new to veggie gardening, and
- You can add more boxes as your confidence and interest grows,
- They are a great project to do with the kids, you never know they might be the start of a lifetime of gardening,
- They make a great present for a family member or friend who isn't a veggie gardener,
- If you are in rented premises you can pick up and take your veggie garden with you if you have to move, or the landlord won't let you dig up the lawn.

The Process

The process is simplicity itself!

1. Get hold of the polystyrene box and make sure that it has sufficient drain holes to precent water logging. If there are no drain holes, like with a broccoli box then cut or push some through using a hot wire or hot soldering iron etc. Holes can be drilled into the polystyrene but it creates a whole stack of little white balls that get EVERYWHERE!

2. Half fill it with grass clippings and weeds making sure that none of the weeds have a seed head that will create problems afterward. It would also be better to leave out things like wandering jew or couch grass runners unless they have been left to dry out in the sun first, just in case. The weeds will decompose slowly and provide nutrients for the veggies so to get a better result use a mix of weeds providing a mix of nutrients.

3. Get hold of or make some good quality potting mix. If you want to make it you could try the 1 sand: 2 worm castings or compost:3 cocopeat mix or if you are buying it in get some middle of the range stuff (not too el cheapo) that is designed for growing veggies. Fill the box right to the top, the soil surface will drop somewhat as the weeds decompose.

4. Plant appropriate veggie seeds or seedlings

5. Mulch any seedlings with a light mulch such as sugar cane but don't mulch areas where seed is planted, particularly small seed like carrot or it may have difficulty breaking through once it is germinated.

Keep your box 'o' veggies in the sun, but near at hand so that you can harvest them when you need them. Even if you are an experienced grower it can be nice to have salad veggies or herbs in a box near the back door when it is cold and raining.

5.3 Making a wicking bed box garden

In the above article you will read how to make a “Box Fulla Veggies” box garden out of a Styrofoam veggie box using some weeds and a bit of potting mix, it is ideal for almost any area I thought, until I met a lady who had problems with the water draining out of it when she watered. It appears that she lived in a second storey flat and only had the balcony to grow her veggies on and while she gave it a go, she had to keep apologising to the folks below for raining on their parade. The answer of course was to put together a box garden that did not need to drain by turning a Styrofoam broccoli box into a wicking bed.

The wicking bed is also very water efficient so if your veggies are without care for days at a time and/or you live in a hot area you may consider this as a more water efficient alternative to the standard veggie box garden. We use a Styrofoam broccoli box because it is light, available and cheap - there are some things that are totally undervalued by our society and in my opinion the Styrofoam veggie box is one of them. The process is simple –

Get hold of a broccoli box, a bag of potting mix or similar growing medium, some material to support the potting mix such as wood chips, gravel, perlite etc. (gravel is heavy and perlite is expensive so I go with the wood chips) and a length of filler pipe (I used some 55mm OD PVC because it is what I had hanging around and it is wide enough to allow you to see the water level).

1.Cut the filler pipe so that it is several inches longer than the depth of the box and then using a band saw or hand saw, cut a vee shaped notch out of the bottom of the tube to allow water to fill the support material

2.Place the filler tube into the box and then half fill the box with the support material.

3.Using a hot electric soldering iron punch a hole through the side of the box roughly level with the surface of the support material. This will be the overflow hole.

4. Place your growing medium into the box up to the level of the rim or slightly lower and then place organic mulch such as sugar cane mulch (bagasse) on top.

5.Plant your seedlings through the mulch then fill up the water reservoir through the filler tube until water comes out the overflow hole.

Once you have your box put together but before you add the water, I suggest you position it roughly where you want it to go because putting in the water is likely to add another 8 to 10 kilograms of weight and moving it around after that will definitely be a two person job.

To keep up the fertility of your box garden apply a liquid fertiliser every two weeks. By making multiple boxes you will be able to produce all sorts of veggies and can even use crop rotation by not planting veggies from the same family successively in each container. The level of the growing medium will drop over time and need to be topped up.

This is another project that is good to involve the kids with; it's fun and will teaches them something about growing their own food, so give it a go!

6.0 Vertical Growing

6.1 Hanging Pots

Hanging baskets/pots are great because they increase the amount of food you can grow, particularly if you only have a small space, make unproductive spaces productive and are good for amenity (they look nice). Over the years I have tried them with varying levels of success mainly because they have one significant downfall – the dry out quickly, particular if exposed to the hot dry winds of a western Sydney Summer.
I am always on the lookout to increase the area we can use to grow productive plants and just recently have been re-evaluating some of our vertical spaces. I have not done anything with hanging baskets for years and certainly not since the new back deck was constructed. So, I took some time to have a look at what we could do.

Where to Hang them?

Just to refresh, our deck is on the western side of the house, to reduce the amount of sun hitting the back wall of the house and making it more tolerable on those really hot days, without having to run the air con 24/7. It was a great place to install productive hanging baskets, but I had a bit of a dilemma. If I installed the hooks on the outside end of the rafters, the baskets would get lots of sun in the cooler months but they may overheat in the full heat of summer, If I put them inside the protective blinds and under the shadecloth covered area they would not get enough light, particularly at the start of the growing season before the plants started to spill over the edge and trail down over the pot. What to do?

After much consideration, and to illustrate that light shines through to even the dullest places at times, I had my answer. As they say in the taco commercial - “Por que no los dos!” ie, why can’t we have both? So that is what I did, I installed two sets of hooks for each hanging basket so that they could be hung in the outer sun-drenched area or the inner more protected area as required.

What Pots?

The next decision was which pots to use. I wanted hanging baskets that were a decent size and after some looking around I found a brand that offered 340mm wide, 8 litre plastic self-watering hanging pots which were Australian made, so I bought half a dozen. I am not a huge fan of commercial self-watering pots because I find that the reservoir is usually too small and they are more of a gimmick than serious gear, but in this case I figured every little bit helps.

Mind you, I had no intention of leaving them like that. Before I put soil into the pots I made up an olla composed of two 12cm unglazed terracotta pots connected with silicon sealant, and with the same sealant blocking up the drainage hole of the bottom pot. This will give me a reservoir capacity of a bit over a litre, plus whatever is in the self-watering pot reservoir itself.

What plants?

This one was fairly easy. I wanted to grow productive plants which would trail over the side of the pot and look nice and jungle-y, so I chose cherry tomatoes and lettuce plus Lebanese cucumbers as well.

More detail on container growing is available by downloading our eBook: Growing Food Crops in Pots

6.2 Vertical Growing with a Cylindrical Trellis

There are times when it is handy to have a trellis that can stand up by itself and support stuff you are growing in the veggie patch. It is even better if it is cheap and easy to build, with a minimum of tools and light enough to be easily relocatable. I made a couple a few years ago and have found them to be very useful in the veggie patch for tomatoes which require staking, cucumbers, peas, beans and just about anything else than climbs.

To make these wonderful things you need to get hold of a coil of wire mesh. The mesh needs to be big enough so you can get your hand through and retrieve the fruits or veggies growing inside the trellis. The wire mesh I used was 150mm x 150mm and this made retrieving errant fruit quite easy. The wire itself should be strong enough to maintain its shape while laden with fruit, although the cylindrical shape is as strong

shape to start with, but flexible enough to bend when needed. The wire in the mesh I used was 2mm thick galvanised mild steel.

What makes the cylinders easy to make is that the wire mesh comes in a roll and its natural tendency is to keep that cylindrical structure, getting it to lay flat can be somewhat difficult but it makes forming the cylinder easy! The roll was 1200mm wide so that translates into a trellis 1200mm high.

Work out what diameter trellis you wish to make, I found that for the size of my veggie patches (1200mm wide) a trellis about 600mm to 700mm in diameter works well. Uncoil sufficient wire to give you a trellis the right size (it will generally remain in a cylinder anyway) by standing the coil upright and unwinding the wire mesh outwards. You will be able to do this by yourself but a second person to hold the coil in one place while you unwind the wire will make the job easier.

Once the mesh has been wound out to the required diameter, grab your trusty pliers or side cutters and cut the mesh from the roll so that the bit you cut off has protruding wires and the end of the main roll is flush with the last upright wire. This means that

you have some wire protruding from the cut end of the cylinder which you can use to secure the cut end to the free end of the mesh. Then it is just a case of forming the cylinder and twisting the protruding wires around the horizontal wires in the first mesh of the free end. This can be done easily by hand but wearing gloves will reduce the likelihood of cuts from sharp wire ends.

To install the cylinder trellis, place it on the area of veggie patch where you want it to be (mulch first if you are going to). Then, to prevent it falling over when laden with goodies, secure with three or four tent pegs pounded well into the ground and at an angle, so they won't pull directly out. Plant your veggies around the inside or outside of your cylindrical trellis and watch them grow!

If you are really canny you might try installing an olla in the middle of where the trellis is going to sit before you put it in place that will keep your veggies well-watered through the driest summer. This past summer I grew tomatoes this way. We had three months without rain and the only water the tomatoes got was when I refilled the ollas two or three times a week. They grew well too!

7.0 Succession Planning and Planting for Year 'Round Food

Creating The Plan

1. List what veggies you want to eat each year – There is a list to help you out here, but this will work out best if you do your own research. Start out with the veggie you are eating now and list the type and variety (if you know it). If you are only eating commercial veggies from Woolies this can be difficult. If you buy your veggies from a fruit and veg shop, organic shop or growers market ask the proprietors if they can help you find out. Mind you it would be a waste to grow some commercial veggie varieties, bred for transportability rather than flavour or nutrition but you must start somewhere.

At this point it is also worth doing some research. Hit the books, the seed catalogues and the net and see what varieties are produced in or near your area/climate zone. Local growers, especially backyard growers can also provide a mine of information on what varieties do well in your area and are worth eating (notice I did NOT say to hit the local growers!).

2. Find out when in the year each food likes to grow – The seed catalogues and veggie books come into their own here by providing general information on when individual vegetable should be planted to get the best out of them. Individual varieties will vary within these general figures (more on that later) but at this point the information you glean will enable you to work out which vegetables can be sown or harvested during which months of the year. Obviously the climate will have a considerable impact on these dates so you really should only look at information generated as locally as you can find. We live in the temperate zone here in Aus and so looking at recommendations for outside that zone will only be misleading.

3. Guess how much of each food you want to eat – This can be as complex or simple as you like. The numbers can be arrived at by keeping a food diary for year and entering what you eat each day in that, doing it for a month or to then extrapolating for a year (not as accurate due to seasonal supply issues) just sit down with the family and guesstimate how much veggies you will need.

4. Work out how much growing area you have – to get the most out of the plan you will need to factor in how much land you intend to put down to growing veggies. We found that a number of smaller (1.2m x 2.0m) beds worked out better for us, being easier to manage and rotate producing smaller crops more regularly. When you work out your growing area don't neglect some less conventional growing spaces you may have access to –

a. The front yard
b. Spare space in friends, relatives or neighbours yards
c. Community garden plots
d. Pots/containers on patios, roofs, driveways or other unused spaces

By having an idea of the area of land you have available to work with you can estimate how much food you can be growing at any one time. We work on a spacing of about 30cm between each plant and interplant rather than waste space with row plantings.

5. Create a plan – with all the homework done you can now draw up your plan. One of the things that amazed me when we convened a "Year Round Growing" group at Permaculture Sydney West to develop succession plans with people was the variety of plans developed. Everyone's plans, while accomplishing the same thing, looked and functioned differently. So while I include here a couple of examples to get you started, don't be afraid to have a go at developing your own from scratch.

6. Follow your plan – As stupid as it sounds, you really need to do this! I found by putting aside a Sunday morning twice a month to sow, pot on and plant out I got into a rhythm after a while and everything just flowed. What I did find was that if I did forget or didn't bother, the effect was not immediate but a couple of months down the track yields began to suffer and plants which I should be starting to harvest were just not there.

7. Record your harvest, to plan for next year – It is very rare to get anything right first time around, so record any successes and failures and review your plan once you have

been following it for 12 months. Even if you adjust your plan on-the-run during the year an end of year review of what worked, and what didn't, can help you improve your plan year on year. Until you find you are the envy of your neighbours and they will be breaking down your door wanting to know your secret!

What to Plant	When to plant it	Amount	Sowing	Where?
Basil	Sep, Oct, Nov, Dec	5 / 1st & 3rd month	S or P or G	P2 I & B3M
Asian Greens	Mar, Apr, May (then,) Sep, Oct	5 /month	S or G	B1 I
Beans – Climbing	Jan, (then not until) Sept, Oct, Nov, Dec	10 / month	G	B4 I
Beetroot	Jan, Feb, Mar, Apr (then) Aug, Sept, Oct, Nov, Dec	10 /month	S or G	B4 M B1 I
Broccoli	Jan, Feb, Mar, Apr (then, not until) Sept, Oct, Nov, Dec	5 /month	S then, G	B2 M
Cabbage	Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec	5/month	S then, G	B2 M
Capsicum	Sep, Oct, Nov, Dec	10 /month	S then, G	B3 M
Carrots	Jan, Feb, Mar, Apr, May (then,) Sep, Oct, Nov, Dec	20/month	G	P M & I & E
Celery	Sep, Oct, Nov, Dec	5 /month	S then, G	B2 I
Chillies	Sep, Oct, Nov, Dec	5/ season	S then, G	P M
Corn	Jan , Feb (then, not until) Oct, Nov, Dec	15/month	G	B5 I & M
Coriander	Jan, Feb, Mar (then, not until) Sep, Oct, Nov, Dec	10 /month	S or G	P3 E & I & M
Cucumber	Jan, Feb (then, not until) Sep, Oct, Nov, Dec	5/ month	S or G	B3 M
Eggplant	Jan (then, not until) Sept, Oct, Nov, Dec	5/ month	S then, G	B4 M
Garlic	Apr, May, Jun, Jul, Aug, Sep, Oct	20 /month	G	B4 I
Kale	Jan, Feb, Mar, Apr, (then not until) Sep, Oct, Nov, Dec,	10 / month	S then, G	B4 E
Leeks	Jan, Feb, Mar, Apr, (then) Aug, Sep, Oct, Nov, Dec	5/ month	S then, G	B3 I
Lettuce	Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec	10/ month	S or G	B2 I
Onion	Feb, Mar, Apr, Jun, Jul, Aug	20/ month	S or	B1 I
Peas	Apr, May, Jun, Jul, Aug, Sep	5/month	S or G	B1 M
Potatoes	Aug, Sep, Oct Nov, Dec	10 tubers/month	G	B5 M or P3 M
Pumpkins	Jan (then, not until) Sep, Oct, Nov, Dec	5 once	G	B6 M
Spinach	Mar, Apr, May (then,) Aug, Sept	5 / month	S then, G	B4 E
Tomato	Jan, Feb Mar (then, not until) Aug, Sep, Oct, Nov, Dec,	10/month	S then, G	B4 M
Zucchini	Sep, Oct, Nov, Dec	5/month	5/month	P2 M

Sample Plan 1

Vegetable	Variety	July		August		September		October	
		Week 1	Week 3	Week 1	Week 3	Week 1	Week 3	Week 1	Week 3
Basil	Sweet	4 plants		4 plants		4 plants		4 plants	
Beans					1 row	1 row	1 row	1 row	1 row
Beetroot	Crimson Globe						1 row		1 row
Bok Choi					4 plants	4 plants	4 plants	4 plants	4 plants
Broccoli	Green sprouting	4 plants	4 plants	4 plants	4 plants	4 plants			
Broad beans	Coles Dwarf	1 Row							
Black Turtle beans								Full bed	
Cabbage	Sugarloaf	1 plant	1 plant	1 plant	1 plant	1 plant	1 plant	1 plant	1 plant
Capsicum	California Wonder	4 plants			4 plants			4 plants	
Chilli	Cayenne	2 plants			2 plants			2 plants	
Carrots	All year round				Half Bed				
Carrots	Chantenay				Half Bed				
Cauliflower		2 plants							
Celery	Golden Self Blanching				2 plants		2 plants		2 plants
Cucamelon									
Cucumber	Lebanese			1 plant		1 plant		1 plant	
Garlic									
Kale	Scottish								
Leek							12 plants		
Lettuce	Mignionette - green	2 plants	2 plants	2 plants	2 plants	2 plants	2 plants	2 plants	2 plants
Lettuce	Oakleaf	2 plants	2 plants	2 plants	2 plants	2 plants	2 plants	2 plants	2 plants
Luffa						3 plants			
Malabar spinach						3 plants			
Onions	Gladalan white or brown								

Sample plan 2

Note - the complete sample plan 2 and a blank to use for developing your own may be downloaded from our website **here**.

Choose Your Variety

From your review of the seed catalogues and other data it will become obvious fairly early that some veggies such as tomatoes will have hundreds of varieties whereas others such as Brussels Sprouts may only have a one or two. Having a large number of varieties is good because it means you have some choice over what you grow and eat within the broad heading of each vegetable. It also increases the likelihood of finding a variety or two which fits your particular soil and climatic circumstances and using different varieties can allow you to spread your harvest (see below).

However, the large number of varieties can make it difficult decide on which ones to grow and while it is very much a personal decision, here is some information that may help you decide –

Early, main crop or late? –Some vegetables have been bred to be harvested early in the season and so have a shorter time between sowing and harvest. Some even have the word 'early" in their name which is a dead giveaway, eg Early Jersey Wakefield cabbage, Early Scarlet Horn carrot or Phenomenal Early cauliflower but mostly the data from the seed catalogues will point you in the right direction. More often than not the more common varieties tend to be main crop, ie they have a growing time which allows them to be harvested at the height of the growing season. Others have even longer growing times and linger on being be harvested late in the season without a drop in crop quality. It is even possible to plant an early, main crop and late variety of the same vegetable all at once and harvest each one as it becomes ready, thereby spreading the harvest.

Growing Habit: Determinate vs indeterminate – a few vegetables, such as tomatoes, peas and beans contain varieties within their ranks that will grow, mature and be harvested within a specified time and a defined plant size. These are referred to as having a determinate growth habit, also referred to as "bush" or "dwarf" varieties whereas other varieties of the same plant may continue to grow throughout the season. These varieties are referred to as indeterminate, also referred to as "climbing" or "staking" varieties and these will produce for as long as the soil and climatic conditions will allow.

Needless to say, determinate varieties will need to feature in your succession plan for regular replanting while the indeterminate varieties will occupy space in the garden for longer and may interfere with your rotation if you are rotating your plots. Determinate plants are also more likely to give you a single major harvest then little or nothing while the indeterminates will spread the harvest out providing less at any one time but spreading the harvest out to give you more produce over the growing season. Thus if your process calls for regularly planting determinates, this will provide more produce over the year (per unit of ground) than only planting indeterminates at the start of the growing season.

Flavour (and other attributes) will vary between varieties – back when I first started growing our own veggies and the kids were a lot younger, I was getting a good response from everyone for the dwarf stringless beans I was growing. I wanted to increase my production so I went from dwarf to climbing beans. The kids HATED them, and refused to eat them so it was back to the drawing board. You may want to try out a few varieties of each veggie before you settle on which ones you want to grow, or even try before you buy if possible, but keep the family involved!

Ask what varieties do well in your area – Again, talking to other backyard growers about what varieties they grow and why, what varieties do well in the area, what ones are particularly tasty, or keep well or both. Don't lose heart if there are no backyard growers in you immediate area. See if there are any community gardens in the area and talk to growers there, contact your local permaculture or seed savers group for advice too.

8.0 Irrigation

I have been using the ideas in the low-cost low-tech irrigation series for a while, some for years, and they all have their merits and their down sides. I started out making ollas from scratch and it was my intention to fill our 14 veggie patches with them (4 or 6 per patch depending on size), but it was a slow and expensive process, all I could manage was two every three weeks. Having said that I did manage to make over 30 of them before quitting.

The low-cost low-tech irrigation types discussed in this section are –

• Ollas, made from commercial terracotta pots, (I have made some from scratch with clay, but they are beyond the scope of this eBook).
• Buried pipe,
• Buried capsule

These have been installed in our backyard veggie patches

General Comments

The reason I made and used these different irrigation techniques is because here in western Sydney the summers are getting hotter and drier. I think climate change is catching up with us but that is for smarter minds than mine to debate! Nevertheless I find myself watering more and more in summer (as well as other times) to keep the food coming, so it made sense to do it the most efficient way possible.

The irrigation methods, while having their own peculiarities, do all seem to reduce the amount of time and water spent on irrigation, while putting the water exactly where it needs to go. There is no substitute for rain, but these irrigation methods do allow me to still get a harvest in the hot, dry times. The new methods have also allowed me to go for longer in the dry times, watering from the tanks rather than town water.
Here are some thoughts on what of learned through experience with the low cost/low tech irrigation techniques –

From Scratch vs Terracotta Pot Ollas

Apart from the obvious production difficulties if you are not a potter and/or have no access to kilns and such, from-scratch ollas will take more time to produce. I can make half a dozen ollas from commercial pots in a few hours but from scratch ollas would take me almost 2 hours each, plus drying and kiln time. Mind you, while I did get lots of production experience, I would not call myself a skilled potter so someone more skilled in the art (as they say) would be quicker.

Also, I was using a technique called coiling, which tends to be slower that say, throwing on a wheel or even better, slip casting so again, someone with more skill/experience than myself in these alternative techniques could do a quicker job.

My from-scratch ollas have thicker walls, 10-12mm or so whereas the commercial terracotta pots have walls half that thickness. The result is that water will move through the walls in a terracotta pot olla in a day or two but may take a week or more for a from-scratch olla to completely empty. The amount of veggie patch watered by each is a bit difficult to estimate but you get a quick watering with the terracotta and a longer slower watering with the from-scratch one.

Plug vs No Plug

All of the from scratch ollas have a purpose build top to keep crap and bugs (including mosquitos) out and water in, because they have a wide opening at the top, sometimes big enough to get my hand in. The opening in the bottom of a terra cotta pot is much smaller and some are of a size which can be fitted with plugs (bought from the 'irrigation fittings' section), again to keep the water in and crap out. To simplify watering, I tend to leave the plugs out, which makes it quicker and easier to get the water in, the plug will be refitted before the chooks get access to the area. Due to the quicker emptying of the plant pot ollas, mozzies seem to be less of a problem.

Watering

Putting water into the irrigations systems by hand can be a bit slow, although it is still a lot quicker than standing there with the trigger nozzle set on "shower" and hoping the water gets where it needs to go! Also, with experience I have come up with a way which makes watering reasonably bearable. Hoselink (look 'em up) have an item on their inventory called a "Root Waterer and Soil Breaker" which is essentially 840mm of 15mm diameter metal tubing fixed onto a trigger nozzle. The idea is you can push it into the ground and water roots of plants directly into the soil and while I haven't tried to, you could probably make one yourself (or just buy one of theirs).

What I have found is that it is perfect for going into the filling holes of both types of olla, the hole in the top of the buried capsule reservoir as well as the filler area of the buried pipes. It even fits the filler necks of our self-watering pots. The end of the tube is bevelled so most of the time I can lever it up under the cap of the from-scratch ollas, fill them with water, then pull the tube out allowing the cap to fall back into place.

In most cases it allows you do this in a standing position (unless you are hugely taller than me), easing the strain on your back while delivering the water directly to where it is needed. We have it set up so that it will work on the hose (through a pump) on the main tank or on the town water if our tanks are empty. The town water is a bit higher in pressure so reservoirs are a bit quicker to fill than when we use the tank. Having said that, even with the tank water it only takes a bit over an hour to fill all irrigation points in the backyard, every few days (unless you are in a real hot spot).

Reservoir vs Direct Water Use

While all of these techniques direct the water to where it is needed most, some provide an amount of water storage, while others just direct the water flow under the ground, thus minimising water wastage. Ollas (of either type) and buried capsules provide some level of water storage while buried pipes supply water but do not store it. This just means that reservoir type will provide a longer time between irrigations, although it is better to refill the ollas at least when they are half full to ensure the amount of water available is sufficient.

Installation

All irrigation methods will require to be dug in to be most effective. While this is easiest at the construction stage of the garden when beds, trees, shrubs and herbs are being put in, retrofitting is always an option.

Ollas and **buried** capsules can be dug in using an auger post hole digger, they usually come in 150mm or 200mm size, which is a good start even if your olla has a greater diameter.

Unfortunately, the **buried pipe** needs to be dug into the bed they are going to irrigate and that is all there is to it. I did it when the beds were vacant after being cleaned off by the chook tractor. That way I was only doing one at a time rather than a whole stack at once.

Final Comments

Putting the different irrigation methods into practice has been a lot of fun and taught me a lot. It has been good to look at my food growing systems with new eyes, to work out which methods will do best where and if you have knowledge of your options before putting a garden together it makes things easier. I didn't design my garden, it developed over almost 40 years, so being able to retrofit was important to me, but if you are looking at putting a garden together, cover your water issues first!

If you are in a place where your climate is likely to become warmer and drier and sadly that seems to be a lot of Australia, take a good look at these ideas, try them out and work out which ones are for you. At the very least you will save time and water! Information on more irrigation methods are available by downloading our eBook: Low Cost, High Efficiency Irrigation

9.0 Growing vegetables from Seed

9.1 Why Grow Veggies from Seed?

Next to being able to save seed from your own veggies, I think the ability to grow your veggies from seed is one of the most valuable skills to have. It is easy to learn, needs a minimum of kit and does not require a huge amount of time, money or effort, but why should we bother?

I'm glad you asked!

Reasons to grow from seed –

1. **Save Money** – A cheap punnet of 8 to 10 veggie seedlings can cost around $4.00 (AUD, 2023) and some can even run as high as $8.50, whereas a packet of 750 lettuce seeds can be had for as little as $2.00.

2. **Variety** – As far as commercially available seedlings go, you would be lucky to find 3 or 4 varieties of, say, tomatoes available at the hardware or nursery, whereas there are over 200 varieties of tomatoes that can be grown from seed. There may be a variety out there ideally suited to the environment you are growing in, and if you grow from seed you can try out as many as you want! Also, if you want to try growing an unusual vegetable, it may not even be available as a seedling and growing from seed may be your only option.

3. **Grow from your own** – As I mentioned above, being able to save your own seed is a valuable skill to have, but to be able to capitalise on that of course, you also must be able to grow vegetables from your saved seed.

4. **You can grow root crops** – Root crops need to be direct sown where they are to grow and do not do well if raised in a punnet then transplanted. I know that it is possible to buy carrot seedlings in punnets, but they will not do well and are a waste of money. The seeds need to be sown directly, and a knowledge of growing from seed will assist!

5. **Resilience** – You can store seed, home grown preferably, but commercially available as well. This will increase your options should there be personal issues like unemployment, or if there were to be something more widespread, like another pandemic. In the middle of the Covid pandemic, when there was a renewed interest in home growing, seedlings and then seed became difficult to get. If you are used to growing your own veggies from seed, you won't be reliant on others for seedlings and so more resilient in your food growing.

6. **Spread the Harvest, reduce waste** – One of the things with buying, say, a punnet of 8 to 10 lettuce seedlings, is that they all go in the ground at the same time and mature at the same time. So, unless you have a big family it is highly likely that you will harvest two or three of your lettuces before the rest start to bolt to seed and become bitter. Sowing your own means you can grow as many as you want, when you want, reducing the amount of your crop that doesn't get eaten.

7. **Control** – You will know what has been applied to the seedlings, and what has not. There is no way of knowing if commercial seedlings have been treated with chemicals of some type. Note - If you want to grow organically and are growing from commercial seed, check the packet to ensure that the seeds have not been coated with a fungicide prior to being packaged. It should make note on the packet that the seeds are not suitable 'for food, feed or oil'.

8. **Satisfaction** – it is remarkably satisfying to be able to harvest and eat a vegetable which you have nurtured throughout its entire life journey, from germination to maturity.

Whether you are direct sowing your seeds, or sowing into punnets to grow your seedlings, it is worthwhile from so many angles. It is a simple skill worth acquiring, why don't you give it a go today? To see how, keep reading!

9.2 Sowing, Potting on and Planting Out

9.2.1 Sowing seed into punnets

Planting seedlings rather than seeds means you can get a jump on the weather by raising the seedlings under plastic early in the season and then planting out when the weather is warmer. Planting well grown seedlings also gives them a jump on pests set to devour frail little plants, and when you plant a seedling you don't waste time and garden space waiting on seeds that are not going to germinate.

The following method also allows you to hold seedlings for a while if you get inclement weather, don't have the beds prepared or life happens, and you are short on time. It also minimises transplanting shock on the seedlings too.

Generally speaking, the seeds of root crops like carrots, parsnips and beetroot etc, need to be sown directly into the soil where they are to be grown. If they are started in punnets and transplanted they will not grow well. Large seeds like those of peas, beans, corn etc can also be direct sown but will also work if the following process is used. All other vegetable crops will thrive using the process of sowing into punnets, potting on into newspaper pots and then planting out.

These are some punnets in my collection

I have a world class collection of plastic punnets! They are all left over from when I used to buy seedlings from the nursery and before I realised how easy they are to grow yourself. I use the punnets with eight divisions or cells in them although for larger seeds like pumpkin I can still use the older style with no divisions.

If you are re-using your seedling punnets you should wash them in disinfectant and dry them off before you use them. This is to prevent a build-up of diseases like damping off, I usually use Dettol® or one of the "el cheapo" quaternary ammonium disinfectants available from the supermarket. Another way is to wash them with soap and water, then put them out in the sun to be dried and disinfected by the sun's rays.

This is the style of punnet I use mostly today

To fill the punnets I make a seed raising mixture that it composed of -.

- 1 Part by volume coarse sand (not brickies sand or the sand that goes in a child's sand pit, that is too fine)
- 2 Parts by volume of sieved (and preferably home produced) compost or worm castings*
- 3 Parts by volume of cocopeat or horticultural coir

Sieved compost (L) and Raw compost (R)

*When I started out, I was using compost exclusively, and while being stored in the greenhouse it got a bit of heat treatment which may have killed off any pathogens, I make a cool compost. I started to get problems with the seedlings keeling over from damping off and changed over to the worm castings. That was over 15 years ago and the damping off has not returned so you may take what you will from that.

This is what the mix looks like

The compost/worm castings give some nutrition and body to the mix, the cocopeat ensures water retention and the sand ensures drainage. I was adding one part of perlite to the mix and also tried vermiculite, but both were expensive so I left them out and it did not seem to make any difference. I use a 500ml plastic Chinese food container as a measure. All of this is placed that wonderful product, the cat litter tray – cheap, available and mind bogglingly useful, more on them later. Mix by hand and voila! Homemade seed raising mixture.

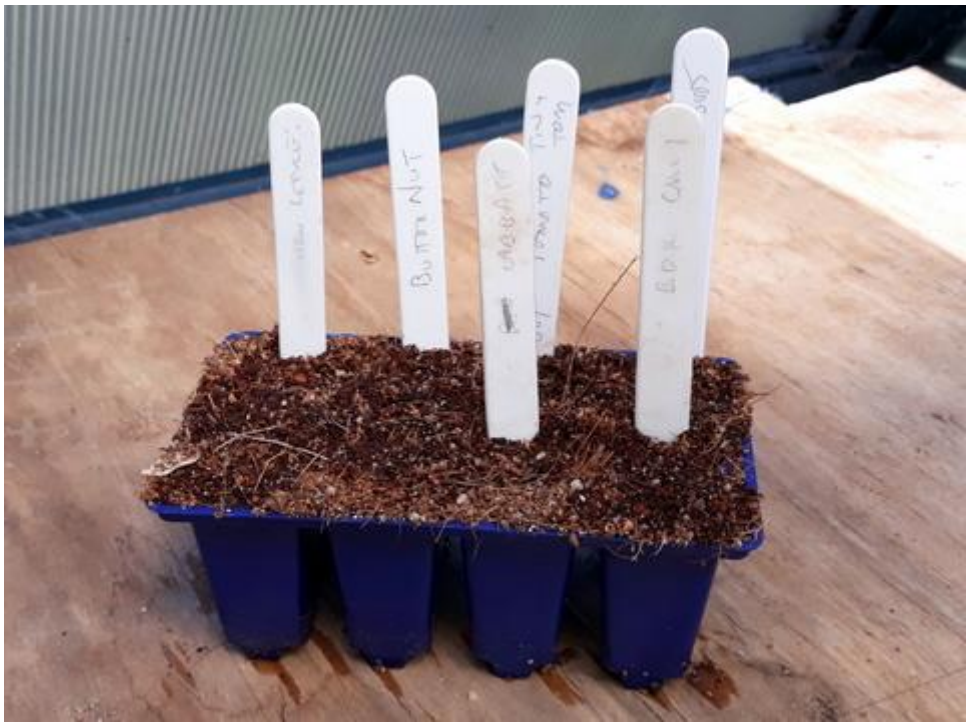
Vermiculite (L) and Perlite (R)

A Quiet Warning

I don't know the technicalities, but some people have gotten sick with Legionella infections after working with commercial potting mixes, when they inhaled the dust. If you keep all your raw materials moist that should keep the dust down and mixing outdoors where there is plenty of ventilation will also reduce the risk. If you are still concerned, purchase an Australian Standards approved dust mask to wear while doing this work.

One of the things about buying commercial seedlings in punnets is that you get a load of the same veggie seedling at one time, meaning that they will all get planted out together and then be ready to harvest together. This means that some will bolt to seed

or become over ripe before you can consume them. To avoid this eventuality, I use eight cell punnets and then sow a few seeds of each type or variety of veg in each cell. This is the way our system is designed to work by providing a continuous small harvest which is consumed quickly rather than a large harvest at once which then needs to be preserved. There are some exceptions to this such as corn and onions but this is the system we have been running successfully for over fifteen years.



A punnet sown and labelled

To sow your seeds in these punnets, place your homemade seed raising mix in the punnet and firm it down with a finger, leaving a small depression in the centre of each cell. Place a few seeds into the depression and add a light cover of potting mix over the top and press down gently to give good seed raising mix to seed contact. As a rule of thumb, seeds should be sown a maximum of two to three times their diameter deep into the soil or seed raising mix. Some seeds, such as lettuce, will germinate better if they have access to light and so should be sown more shallowly.

The veggies have sprouted!

The surface of the seed raising mix should be flush with the surface of the punnet so that there is good air drainage, otherwise still, moist air can favour damping off, a fungus which causes the new seedling to look pinched where they emerge from the soil, killing them. Label the division with a tag (These can be cut from an ice cream carton with scissors) showing the vegetable type and variety, plus sowing date if required. Follow this process for the rest of the punnet divisions.

Once the punnet is full it needs to be kept warm and moist until the seeds germinate, but watering from the top can wash the seeds out of the seed raising mix so they need to be watered from underneath. The easiest way to do this is to make a capillary bed by getting one of the aforementioned cat litter trays and half filling it with coarse sand (fine sand will crust over) I use the same sand I add to the seed raising mix. Add a couple of bottles as water reservoirs and you are good to go!

Capillary bed in action

Place the punnet(s) on the sand and then water the sand until there is just a little free water over the top of the sand. The seed raising mixture in the punnet will absorb the water through the bottom by capillary action eliminating the need to water the punnets directly. Also, the sand will form a reservoir of water reducing the amount of the attention needed by the seedlings. In hot weather place the capillary set up under some shade cloth and in cold weather make a small plastic house, green house or cold frame to keep the seedlings warm. More detail on making a capillary bed is available in Section 3.0 of this eBook.

To ensure a continuing harvest of veggies, I sow a mix of veggies into punnets twice a month. They are then potted on into newspaper pots somewhere between two and four weeks after sowing (depending on time of year) and then planted out two to four weeks after that (depending on time of year). The seeds will take longer to germinate and are slower to grow after potting on in the colder parts of the year.

9.2.2 Potting On

Once the seedling has grown to the four leaf stage, it can be potted on into a larger single container to grow further until you are ready to plant it out into the veggie bed. Originally, I used to do this by making up a potting mix that is a bit richer than the seed raising mix –

1 part by volume of coarse sand

2 parts by volume cocopeat

3 parts by volume sieved compost

But I found the original seed raising mix worked just as well so I now use that mix alone for both operations.

I used to pot the seedlings on into 100mm lengths of cardboard tube that I was getting from where I was working at the time (They are the spool around which paper for the plotter is wound) which were thrown out. To start off with I coated them in wax and the used a wooden slug to push the seedling out so that the tubes were re-useable, but I found that the transplanting shock for the seedling was considerable and after 2 or 3 uses the tubes carried all sorts of bugs that caused damping off etc. so I gave up on that idea and used them uncoated as a single use only, allowing them to rot down and allow the roots out into the soil over time.

The old system

However, I left that place of employment and after 12 months my stock of tubes had depleted, so I moved over to making newspaper pots to do the same job. The seedlings did much better in the newspaper pots and the newspaper pots rot down much more quickly than the cardboard tubes did anyway!

To pot the seedlings on I fill a newspaper pot with seed raising mix then push a hole down the centre of the mix in the pot with my finger. I then dig the seedling(s) out of

the punnet with my space age technical potting on tool (a paddle pop stick). I push the stick down into a cell of the punnet and then push it back while lifting, levering the seedlings, their root mass and the seed raising mix out of the punnet. This minimises damage to the seedlings.

My potting on tool!

I tease the mass of roots and seed raising mix apart and choose the largest and most well grown seedling(s) to pot on, keeping as much of the seed raising mixture around the roots as possible. I place the seedling gently into the newspaper pot, then top the newspaper pot up to level with the edge and place it in a plastic flat (designed for holding punnets) which holds 20 newspaper pots. I carry the freshly filled newspaper pots out to the greenhouse then place them directly onto a capillary bed to keep moist until they are ready for planting out.

9.2.3 Direct Sowing

As mentioned previously, the seeds of root crops need to be sowed directly where they are going to grow if they are to thrive, and large seeds can be direct sown into veggie beds rather than raised as seedlings first. This requires no specialised equipment or training (although a trowel can help to loosen any compacted soil) just some appropriate seeds and a place to grow them. However, each veggie has their own requirements in terms or sun, water, nutrients, soil pH, planting time and so on, so before sowing it is worth doing a bit of research to make sure that will do OK where you are intending to sow them.

Loosening up the seed bed

When it is time to direct sow, check the soil to make sure it is level, moist and has a fine tilth, especially when sowing small seeds like carrot, and that there are no sticks or rocks to inhibit the seedling's growth. This is also a great time to check for and remove any weeds growing in the area.

Seed bed ready to go

Sowing depth is two to three times the seed diameter. For larger seeds you can dig a furrow at the correct depth, sow the seeds the correct distance apart and then cover them over with the surrounding soil, or push them into the damp soil with your finger as I do with our peas and bean seeds. Smaller seed like carrot needs a bit more care and can be sown onto the surface of the bed and then covered with a light dusting of soil, sand or cocopeat.

Pushing in the bean seeds

Once sown, larger seeds can be given a light layer of mulch (1 -2 cm) to maintain soil moisture, but smaller seeds may find it difficult to make their way through a mulch so the soil should be left bare until the seeds have sprouted. In any case, it is important to ensure that the soil stays moist until the veggies are poking their heads through the soil, as this will also prevent a crust forming on the soil that inhibits sprouting.

9.2.4 Planting out

When the seedlings have grown enough, this is usually 4 to 6 weeks from sowing, they can be transplanted directly into the bed newspaper pot and all, the pot rots away and allowing the seedling roots to push through into the soil. Generally, seedlings should be transplanted in the late afternoon or early morning to minimise transplanting shock due to drying out of the seedling by the sun, but when using the newspaper pot method this can be less of a problem. More on this later.

The bed that the seedlings in newspaper pots are to be planted out into will have had the chook tractor on it for a period of two weeks, during which time they will have dug it over, removed any weeds or leftover crops and thoroughly manured it. Once the chook tractor moves on, the patch will be mulched with 4cm to 6cm of straw mulch which has been dug over and thoroughly gone through and any remaining wheat seeds eaten by the chooks in the retirement village. During this process they will have broken the straw stalks down and added their quota of high nitrogen manure to the straw.

A mulched bed

Only once these processes are completed is the bed ready to receive the veggie seedlings and depending on the time of year, the time between the chook tractor moving on and the seedlings being planted may be a week or two or up to a month.

The usual process of potting on is simple enough, a narrow trowel is used to move the mulch aside and dig down into

the soil until a hole in the soil is produced a bit larger than the newspaper pot. The newspaper pot is lowered down into the hole and the surrounding soil scraped in to ensure the seedling is stable and well covered with soil. For plants that send out adventitious roots like tomatoes, the hole will be a bit deeper and the soil heaped up around the seedling to provide extra room for the roots.

Mulched bed, planted out

Each of the seedlings will be planted into a pattern, starting with four seedlings across the width of the bed, followed by three in the next line, then four, then three and so on until the bed is filled. The resulting pattern allows the veggies to be roughly 30cm away from their nearest neighbour, maximising space while allowing room for the veggies to spread out as they grow. As well as planting out the seedlings using this pattern, the seedlings are interplanted, that is to say (as much as possible) the seedlings of the same vegetable family are not planted next to each other. This can reduce issues due to pests, diseases and can increase yields by allowing closer plantings.

Corn grown in a block

There are some exceptions to these planting rules, such as corn, which needs to be grown in a block to ensure cobs are wind fertilised and onions which we grow, harvest and process as a single crop.

9.2.5 Sun Protection

Originally, I found, that while the late afternoon planting works in spring and autumn, planting seedlings in the full heat of a western Sydney summer causes a certain mortality rate anyway, so I developed a movable shade cloth frame. I used it when planting out during the hottest times of the year. Since I operate with standard size beds, I had two half size and two full size covers and they did the trick. By the time the next bed needed it, the original seedlings were strong enough to take the full sun.

Seedling sun shade

Unfortunately, with the effect of climate change, the western Sydney summers are getting hotter and it seems as if the sun is getting more intense, so about ten years ago I came up with the idea of installing semi-permanent veggie bed covers. The framework stays in position all year, but sometime around mid-spring, 50% shade cloth covers get installed and stay in place usually until sometime around mid-autumn at which point they are removed and placed in the shed. More details on the veggie patch covers can be found in Section 8of this eBook.

Semi-permanent cover for three veggie beds

9.3 Making a capillary bed and Newspaper Pots

9.3.1 Making a capillary bed

The amount of water held by punnets in which seedlings are grown is fairly small, and there is nothing quite so demoralising as coming home after a weekend away or a particularly hot day to find all of your seedlings have dried out and are now fried. Fortunately there is a piece of kit which you can throw together quickly, most likely from stuff you already have hanging around, which can prevent fried seedlings from ever happening again. Enter the capillary bed!

Another advantage of using a capillary bed is that it allows you to keep your punnets moist without having to water them from above and possibly washing some of the seeds out. This can be a real problem, particularly with the smaller seeds.

A capillary bed in use

In basic terms a capillary bed is a container of coarse sand which acts as a store of water. Seedling punnets or other plant pots are sat on the sand and water passes up

into them and keeps them moist by, you guessed it, capillary action. The better ones have a method of keeping the water topped up too.

To start making your capillary bed get hold of a cat litter tray, they are available from the el cheapo shops for a few dollars and are mind bogglingly handy for plant propagation and other grow-it-yourself tasks. They are great for mixing seed raising/potting mix, carrying stuff like punnets or pots around and they can be used when sorting seeds from trash. Let's face it, if all else fails you could use it for your cat!

To fill the cat litter tray, you need coarse river sand. Course sand is best because it doesn't crust over and river sand has no salt issues attached as beach sand may. Fill your cat litter tray almost to the top with the coarse sand and then water with a watering can until the sand is saturated. It is then just a case of resting your seedling punnets, newspaper pots etc on the moist sand.

Judging the water level using a pot

I have operated these for years and they work very well, and no fried seedlings!
With a little bit of effort you can extend the period between waterings even more. Get hold of a small pot, the one I use is 70mm long by 50mm in diameter at the top, and

sink it into the sand as far as it will go. Then get hold of a small empty bottle where if you insert the neck into the small pot it comes about half way down.

The pot I used

Fill the bottle of water (I use a 600mm soft drink bottle) and insert it neck down into the pot. As the water level drops below the level of the bottle neck due to evaporation and usage by the seedlings, more water till flow out of the bottle to maintain the level. This will happen until the bottle is empty and requires refilling.

Sand and pot in place

It is a simple thing to make, but it makes growing your own from seed much easier and more secure.

9.3.2 Making Newspaper Pots

For years the process that I followed to produce my veggie seedlings was to put the seeds into punnets, then once they were at the four leaf stage I would fill cardboard tubes with the same homemade mix we used to state the seedlings off and then pot on the seedlings into the tubes. I got the tubes from work, they were 800mm long and 60mm wide so I used my band saw to cut them into 100mm long planting tubes. Unfortunately, about 12 months ago, I was retrenched from that particular job so the supply dried up. It took me the 12 months to burn through the tubes I had in storage but all of a sudden i had to come up with something new.

I have been aware of the old newspaper pot trick for years and never had to use it, but with my tubes all gone, the newspaper pot seemed like the answer to a maiden's prayer, or at least mine anyway. I was concerned that they would not stand up to the task of being moist and full of growing medium for weeks at a time, but they have surprised me! Another surprise has been that the seedlings actually seem to hold better for longer and are happier in the newspaper pots rather than the old tube style, so if you want to follow my ideas give it a go.

Plunger and base - pot maker and they work well

There are apparatuses that you can buy to help you make the pots that consist of a plunger and a base (OK so it is a hopeless description.....just look at the photo!) but you can achieve the same thing with a straight sided drinking glass or jar. For the purposed of making the pots to take out seedlings to grow them on before planting out, a base size of 60mm to 80mm would be best.

1. Get hold of some newspaper and cut it into strips 10 to 12 cm wide by about 60cm long (ie the length of an open newspaper page). If the glass you are using is bigger than the recommended 6 to 8cm the strips will need to be proportionally larger.

2. Wind the strip around the open end of the glass with about half the diameter of the glass or a bit more overhanging the edge.

3. Fold the free edge over into the open end of the glass so that it is lying along the inside surface of the glass. Then slide the paper off the open end of the glass.

4. Place the bottom end of the pot on a flat surface and fold down the inner flap of paper to form the base of the pot then reverse the glass and push it into the pot bottom first so you can push down and flatten out the bottom of the pot. This is easier to do if you are working on a firm, flat surface like a table.

5. Job done!
The pot can now be filled with the seedling raising/potting mix and a seedling. Making the pots is easy; you can make a stack while sitting in front of the TV at night and then plant them out as needed.

More details on growing vegetables from seed is available by downloading our eBook: Growing Veggies from Seed

10.0 Maintaining fertility

10.1 Adding nutrients

Just like animals (including us) plants need the right sort of nutrients in the right amounts to be happy healthy and productive and when we remove crops from the soil and consume them, the nutrients must be replaced. Originally this was done with naturally occurring materials such as manures, ash and compost but with the invention of inorganic fertilisers (originally called artificial manure) we went away from naturally occurring materials and, as usual, stuffed things up. The inorganic nutrients don't take into account the importance of soil micro-life and as the yields reduce more fertiliser is needed to keep pace. They also tend to be very soluble being easily leached into our waterways and ground water causing pollution and some are oil based and come with all the problems that entails.

However, the wheel is turning and organic farming and gardening is making a very strong comeback and you can be part of that comeback in your own backyard veggie patch.

Home Produced Soil Additives

Compost – is a good, all-purpose fertility improver and by composting leftover food waste some of the nutrients removed in harvesting can be returned to the soil. More details on composting and making a bokashi bucket are covered in articles elsewhere on this site.

Wood ash – if you have a wood burning stove or have friends with one, rather than throwing out the ash, add a light dusting next time you are preparing a veggie bed for planting. It is alkaline and so may raise the pH of your soil but a small amount added to healthy organic soil is unlikely to have a huge effect. Wood ash is great for adding potassium to your soil.

Seaweed/kelp – seaweed is a great addition to the veggie patch if you can get hold of it, gather it and bring home a bag full next time you take the kids to the beach. As well as contributing major nutrients it is a good source of the trace nutrients as well, but make sure you wash the salt off before you use it. You can dry it out, crumble it up and add it to the bed before planting, add it to an existing bed as a mulch or steep it in a bucket of water for three to four weeks and apply with a watering can as a general tonic.

Worm castings – In an urban/suburban area you are most likely going to be producing this in smaller amounts, but it is very rich in beneficial soil bacteria as well as chemical nutrients. You can use it to make seed raising mixture, spread it around growing plants under the mulch or add it into the hole before planting your veggies to give the plant a boost when the roots find it.

Poultry manure – Even in the city most people can find room for a few chooks and while their manure is a bit rich to add fresh to growing plants it will give the soil a boost if added when preparing the bed or composted first. Rather than haul the stuff around, we use a chook tractor which means that the chooks apply it direct to the bed, and then when the bed is watered and mulched before planting, it attracts worms into the bed. If you have to buy it in, check that it has not been sprayed with insecticide to keep the flies down.

Urine- There is talk about "peak phosphorus" because we currently get our phosphate fertiliser supplies from deposits of ancient guano which are then mined, and is starting to run out. The answer is to recycle nutrients by diluting our pee ten to one with water and applying to the veggie bed. Contrary to popular belief urine is not sterile so if you are not well, particularly due to bladder infection, don't use it. I wouldn't broadcast about this fertilising practice too much either, the neighbours might not understand your good intentions.

Liquid manure – In general terms liquid manure is made by steeping a nutrient rich material in water for a time to extract the nutrients and then diluting the resultant

"tea" until it looks like weak tea and then applying directly to the plants. The nutrient rich material can be seaweed as mentioned above, manure or better yet a mix of manures, comfrey or nettle leaves or even just a mixture of weeds steeped in water.

Bought In Soil additives

Blood and bone – This is a great way to add phosphorous and potassium to your veggie patch although if you are vegetarian or vegan you may have some ethical problems using it. You should keep it in a sealed container away from pets; years ago my father's dog broke into his garden shed and ate his entire blood and bone supply. It didn't hurt the dog but sure crapped off my father.

Rock dust – Rock dust adds trace nutrients to the soil in an insoluble form that is only accessible slowly as the dusts is broken down by the enzymes released by soil microorganisms. Rock dust also is good for and attracts worms to your soil. You might not see it in your local nursery or hardware store but it is available from supplies on the net such as remin.com.au who are on the south coast of NSW.

Horse/Cow manures – If you don't know what the worming history of the horse is it is better to compost horse manure before applying it to the veggie bed but well rotted or composted horse or cow manure is a great way to add organic matter to your soil.

Dolomite & gypsum – These materials are ground rock containing calcium and, in the case of dolomite, magnesium as well. If you struggle with clay soils as we do around here adding a calcium containing material will improve soil structure. The clay is sodium clay and has very fine pores, adding the calcium material allowing it to react with the clay replaces the sodium with calcium and calcium clays have a much more open structure, so the soil becomes much more free draining. Gypsum is often sold as "clay breaker".

Maintaining soil fertility is basic to producing our own veggies, and keeping our plants happy and healthy so that they have the same effect on us when we eat them. By

returning nutrients to the soil using organic production principles you will make sure that your veggie production is maintained in a sustainable manner.

10.2 Managing Fertility

Crop Rotation

Crop rotation is the procedure of growing different crops successively on the same plot of land instead of growing the same crop on the same land year after year . This results in a number of benefits :-

A) As each crop takes or returns different nutrients to the soil it prevents or minimises the drain of nutrients on the soil so maintaining soil fertility . By crop rotation , mulching and adding compost regularly to the soil artificial fertilizers become unnecessary .

B) It prevents a build-up of pests and diseases which will attack a crop when it is grown year after year in the same ground.

One plan for crop rotation is as follows :-

I. Root crops to start - eg potatoes , carrots , parsnips , turnips or onions . Root crops break up the soil and bring deeper soil nutrients to the surface.

FOLLOWED BY

II. A legume crop , eg beans (in summer) or peas (in winter) . Legume crops fix their own nitrogen (an essential plant nutrient) from the air so when the root system decays the nitrogen remains for the next crop .

FOLLOWED BY

III. A leaf crop , eg lettuce , silver beet , spinach or cabbage . Leaf crops require a lot of nitrogen to produce a good yield of edible leaves so they make use of the nitrogen left behind by the legumes .

FOLLOWED BY

IV. Other crops such as capsicum , tomatoes , cucumber , broccoli or any others which do not fit into groups I. to III. above . Alternatively the fourth part of the rotation can be to leave the ground fallow to grow volunteer weeds which can then be dug under (BEFORE flowering and setting seed) to provide organic matter for the next crop .
THE ROTATION THEN STARTS AGAIN .

Mulching

Mulching is the practice of forming an organic layer on top of the soil around the plants, even over the entire vegie patch. This organic layer has a number of effects on the soil and plants in the surrounding area:

1. It keeps the soil surface cool in summer allowing micro-organisms to function at the soil surface and continue to breakdown organic matter and release nutrients.

2. It conserves moisture - A very important point in times when water may be in very limited supply. A mulch as well as reducing evaporation from the soil surface also increases the proportion of the soil water present in the plant root zone, where it counts.

3. Weeds are suppressed - This reduces or eliminates the need for cultivation or worse yet, pulling out the little buggers by hand. This is an important point because weeds will compete with your crop for light, nutrients, water and space and in so doing can seriously reduce crop yields.

4. Nutrients are released by the breakdown of the mulch so that the vegies have a built-in, time-release food source. The organic matter when incorporated into the soil will also improve soil structure and therefore fertility.

5. The surface of the soil under the mulch is not compacted by rain drops so water runoff is reduced, and infiltration of rain correspondingly increases. By the same token if rainfall is high and drainage not what it should be, mulching can contribute to waterlogging of the soil so keep an eye out for this.

Some materials used for mulching include –

a) Compost - Ideal .

b) Hay or straw - Ideal .

c) Grass Clippings - Can tend to form a water impermeable layer so they should be mixed with sawdust of compost prior to use .

d) Dry leaves - Can also form an impermeable layer so should be shredded or mixed with other material prior to use .

e) Sawdust and wood shavings - Radiata pine material is not suitable as a mulch .

f) Animal manures - should be old and well-rotted down before use or they can burn the plants .

Green Manuring

This is the process of growing a crop on your vegie patch and then digging it in to provide organic matter. This is a good idea when you are opening up a new area or as part of a crop rotation. The most value is obtained by using a legume eg peas, beans, clover, or lucerne which fixes nitrogen at the same time, releasing it to the plants as it breaks down. At least two weeks should be allowed between turning in the green manure and planting vegies to allow the green manure some time to break down. The green manure should also be turned in before it flowers so it is at a succulent stage of growth and will break down earlier and no seed is set to come up as a "weed" later.

More information can be found by downloading our eBook: Keeping the Place Fertile

10.3 Making and using a bokashi bucket

What on Earth is a Bokashi bucket?

It is a small scale food composting system that uses an air tight bucket and special micro-organisms to break down the food and it does so without the yuk factor of the disgusting smells usually associated with anaerobic decomposition. It will also handle some materials that are verboten in normal composters and/or not particularly enjoyed by worms such as onions/garlic, citrus rinds and uncooked/cooked meat. They are ideal for those living in the city and suburban environment that want to compost their waste but are put off by the associated stink and hassle. Does this interest you? If so, then read on!

Making the Bokashi Bucket

Of course it is possible to go out to Bunning's or wherever and pick up a commercial Bokashi bin, but they can cost over $70 and if you are a bit short of cash you can make yourself one for a bit over $10, or less if you have any 20 litre buckets already hanging around.

1. Get hold of the raw materials – 2 x recycled plastic 20 litre buckets with tightly fitting lids, a valve and hollow bolt to go through the side of the bucket. The big hint, particularly if you are using recycled buckets, is to ensure that both buckets are the same size otherwise even a small difference in size can mean that when they are put one inside the other there will be a gap meaning they are not sealed, or they can seal so tight you can't get the buggers apart when you need to!

2. Pick the bucket that you are going to use as the inner bucket and drill some 6mm or so (it's not critical) holes in the bottom to allow excess liquids to drain off.

3. Get hold of the outer bucket and drill a hole as low down the side of the bucket as you can the same size as the hollow bolt or a bit smaller, I used a speed bit and my battery drill.

4. Insert the hollow bolt through the hole form the inside out, wrap the threads in Teflon tape (plumber-on-a-roll) and then screw the valve onto the bolt and tighten up. At this point it is best to test your seal by putting some water in the bucket and checking for leaks around where the valve goes through. If you don't

do this now you may find unmentionable fluids leaking onto your floor and it will be much more difficult to fix. If you do find some water leaking out when you test it, run a bead of the appropriate silicon sealer around where the valve comes out and allow to dry.

5. The material in the bucket must be compressed to remove air spaces so you can make a tool to do this from the second lid, which will not be needed. Measure the bottom of the inner bucket and then draw a circle the same size around the lid using a pair of dividers. You can then cut out the circle using a band saw or jig saw. The plastic top is still a bit flexible to effectively compress the organic material so I grabbed a couple of pieces of recycled 70mm x 20mm DAR and cut two lengths the same diameter as the plastic disk, I then cut a jigged edge lap joint so that the timber formed an X. I screwed the X to the back of the disc and the tool, was ready to go.

6. I grabbed some pieces of scrap timber that I had lying around and cut them to size and screwed them together so that I had a box to sit the whole assembly on to get it off the floor and give better access to the drain valve.

7. The DIY Bokashi bucket was ready to compost (or bokash, or whatever you call it....)

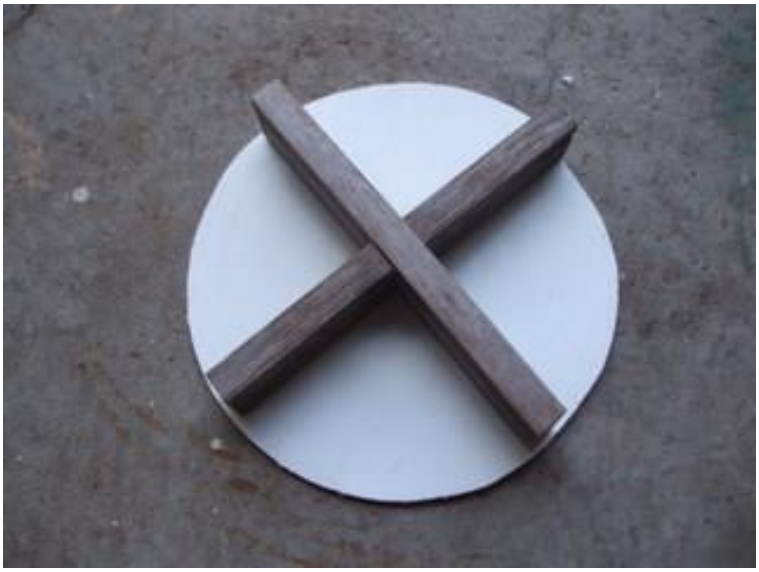
Operating your Bokashi Bucket

1. When you start out, place a 3cm to 4cm layer of your finest veggie scraps etc in the bottom of the inner bucket, then add in a layer of the Bokashi material, which you will need to buy from a hardware store or other supplier. This is one of those rare times, like eating chocolate, where more is better so don't skimp, if in doubt add more. In any case at least a handful per layer of organic matter.
2. Take your faithful compression tool in hand and press down on the organic material to push all the air out. If you want you can leave the tool sitting inside the bucket on the surface of the organic material, I certainly do.
3. Replace the lid on the inner bucket making sure that you have a good airtight seal, because this is needed to reduce the oxygen inside the bucket to get the Bokashi doing its thing.
4. Just repeat steps 1 to 3 every time you get some organic material until the inner bucket is completely full, making sure you put plenty of bokashi material in the last addition before sealing.
5. During this time you should regularly open the valve on the bottom of the outer bucket to drain off any liquid, preferably into a container, the pour it onto your garden beds as a liquid fertiliser.
6. Then seal up the top and leave it for two weeks to finish "Bokashing" (which is a fermenting type process), regularly draining off any liquid as in step 5.
7. Having a second set of bokashi buckets at this point would be good, but otherwise if you don't have too much organic material accumulating you can freeze it and use it to start up the next bucket once it is empty and clean.
8. Once the bucket has finished Bokashing you can use the output for a number of things (See the next section) and once the bucket is empty, clean it out thoroughly and it will be ready to go again either when you other bucket is full or to start now with your frozen stuff.

Any Problems?

If you bucket has not been doing what it is supposed to you may start to get anaerobic decomposition that produces the characteristic rotten egg smell or it may show the presence of black or blue green fungi, and this may be due to one or more of the following causes –

- You haven't put in enough bokashi material between additions of organic matter, remember more is better!
- You haven't drained off the liquid often enough and it is flooding the organic material, although with the larger reservoir of the home made bokashi bucket this is unlikely, it is still possible.
- The bucket lid has not sealed adequately, this is why it is important to make sure your lid seals before you make your bin and to always ensure you seal the lid tight after adding more organic material.
- The bucket has been too hot or too cold for a prolonged period of time. Again this is unlikely if you keep your bucket inside, but don't stick it out in the shed particularly if you are subjected to the 42°C that we get here in a Western Sydney summer!



Now What Do I Do?

Now that you have the output of your Bokashi the question is what can you do with it and there are a number of options –

- Add it to your existing outdoor composter if you have one
- Add it to a worm farm if you have one of those
- Dig it in directly into one of your veggies patches as is.
- Use it to attract black soldier flies. This is the stuff of a whole ‘nother article but briefly you can use you bokashi output in a commercial or homemade black soldier fly larvae farming set up. This set up induces the black soldier fly to lay eggs in or around vegetable waste then captures the larvae (maggots) as they go looking for soil to pupate in. The maggots can then be fed to chooks or fish in an aquaculture system. I have found that the bokashi material attracts black soldier fly like nothing else!

Helping your Bucket do its work

- Do not add water, milk, juice or other liquids to your Bokashi bucket
- Keep the lid firmly sealed at all times
- Cut up any large lumps of organic matter to facilitate packing down

- If you only get small amounts of organic matter you can freeze them until you have enough to make a 3-4cm layer
- Don’t put paper, plastic wrap or meat bones in your bucket
- Keep the bucket in the shade

Update

I must admit that I was never happy with the tap in the original design above, it is just too expensive. I have done a couple of workshops on composting which included making a Bokashi bucket and in the lead up to those I spent some time wandering around the local hardware shop to try and come up with something just as effective but cheaper and lo and behold I did! There are black plastic taps made to screw into 20 litre plastic cube shaped liquid storage bottles but need to be secured in the bottom of the bucket and if you get hold of a 25mm plastic female plumbing connector it will screw straight in. You don't even need the full length of the connector so you can (as I did) saw them in half with a hand saw or band saw and use one connector to fit two bokashi bins with taps. Just drill a 25mm hole in the bottom of the bucket with a speed bit, push the threaded bit of the tap through into the bucket and screw on the half 25mm connector on the other side to secure the tap. It works pretty well but even so I would run a bead of silicone around the outside of the tap seal, just to make sure, so you don't get any Bokashi water making a break for it. Good luck!

11.0 Managing Potential problems

11.1 Organic pest control

Introduction

If you are going to grow your own food, you are going to attract pests to a greater or lesser degree and as much as you don't want to share with them you are bound to lose some and the trick is to contain your losses to an acceptable level. The current agricultural practice of wholesale chemical use is unsustainable and in the long term counterproductive for the following reasons –

- 98% of even the best applied pesticide spray damages non-target organisms ie pest predators, fish, bees, humans – you get the idea.
- The pests have the ability to evolve almost as fast as we can make new pesticides so in the end we lose.
- Pesticides in use are oil based so as the oil becomes more expensive so too do the pesticides.
- They are made by big business/big chemistry and can't be home produced.
- They can build up in the environment – organochlorine compounds like DDT, Chlordane etc. are a case in point

So, there must be a better way and indeed there is, looking after your fruit and veggies organically! Unfortunately over the years we have all been brainwashed by too many pesticide ads on TV, you know the type – "if you have problems with this type of bug just grab your can of 'BugBeGone', spray to your heart's content and your bug problem will be gone!". The organic method of protecting your crops is more holistic than the spray-em-dead approach and while the use of environmentally friendly pest control is part of the process, it is only part of the process. There are some things to think about before reaching for the spray.

Which Bug?

There are a wide number of both good (predators and pollinators) bugs and bad (pests) bugs out there," good" bugs include –

Ladybirds (most species)	Lacewings	Hover flies
Ground beetles	Predatory flies	Assassin bugs
Rove beetles	Praying mantis	Centipedes
Dragonflies	Springtails	Millipedes
Earwigs (Australian)	Predatory wasps	Spiders

While "bad" bugs you might see in your garden could be -

Ants	Cabbage white butterfly	Grasshoppers
Aphids	Loopers	Earwig (European)
Ladybird (26 & 28 spotted)	Budworms	Flies (inc Fruit Flies)
Weevils	Cockroaches	Scales
Shield bugs	Crickets	Snails and slugs
Cabbage moth	Locusts	Thrips

The moral of the story is that there are a huge number of types of bugs out there, good, bad or indifferent and you need to know which ones you have, and you can do this by a combination of observation and research. Get hold of some books from your library, join an online organic growing Facebook group or join your local Permaculture group, get hold of leaflets from your local Dept of Agriculture, often also available free on line and identify the ones, both good and bad, that you need to look out for.

The Organic Approach

Rather than go for short term Band-Aids in the form of pesticides (no matter how enviro-friendly) we need to look at our backyard crops as being part of our backyard ecosystem and then try to keep the ecosystem in balance. We can also be smart and avoid pest problems before they get to the point where a spray is necessary by using some or all of the following strategies.

Observe your back yard and make notes about what you find. Take the time to look at the types of pests and the types of predators already existing in your garden and do it regularly because things change over time. This summer alone I have identified three or four new types of insects that I haven't seen before in our back yard. So, take the time and really observe what is happening in your garden so you will know what you are up against, action early on can prevent a major infestation later in the year.

Start with a healthy soil – healthy soil means healthy plants and healthy plants means they are less likely to become a target for pests. If you follow organic principles and use organic manures and fertilisers, if you mulch well, use green manures and maintain soil organic matter and avoid cultivating and exposing your soil to the sun you are much more likely to have healthy soil. Check and adjust your soil pH if necessary, as well, as soil that is too acid or alkaline can be rough on the microbes in your soil as well as your fruit and veggies.

Attract predators to your back yard – We alter the natural ratio of predator to prey when we use pesticides because we kill off both, but the pest bugs make a quicker comeback, so we need to attract predators to our growing are and keep them there. Providing a source of water in the form of a pond or birdbath is one way, so is allowing some of the veggies we grow to go to seed, because the adult forms of many predators are attracted to the nectar in the flowers. Not using pesticides will obviously help as will allowing some weeds to grow and flower to provide predator habitat.

Practice companion planting and interplant – Nothing is more like ringing the dinner bell for pests than monoculture – a large block of one sort of crop. So grow some strong scented herbs and flowers in your veggie beds to confuse pests and grow differed crop plants interspersed with each other like basil with tomatoes and onions with carrots. My personal experience with companion planting has been mixed and in practice no amount of companion planting I've tried has ever confused the cabbage white butterfly but give it a go and see how it works for you.

Plant resistant varieties – The varieties of vegetables available today is very small in comparison to years gone by, even in plant nurseries the variety of seedlings is only slightly better than the stuff we can get in the supermarket. Fortunately there are specialised seed suppliers like Eden Seeds, Phoenix seeds, Greenpatch seeds and Green Harvest who can supply a broader number of varieties and some will be more resistant to than others to the pests in your back yard eg Roma tomatoes and cherry type tomatoes are more resistant to fruit fly than many main crop varieties. A little research can pay off big dividends in the war against pests.

Time plantings to avoid pests – sometimes, if a troublesome pest has a short season you can avoid planting susceptible crops for that time and this is where your time and trouble in observation will pay off. We have a problem with one of the brassica pests – Cabbage Moth (not to be confused with cabbage white butterfly) which forms webs on the plants and can denude and kill a seedling in a matter of days. Around here though they are a problem only for a month or so in late summer so not planting brassicas at that time can head off any hassles with them.

Non-Chemical Pest Controls

If after you have put the above strategies in place that make sense for you and your situation you still have pest problems it might be time to set up a more targeted pest control plan like the ones suggested below.

Manual removal – In other words, picking the pests off by hand and squishing them, drowning them or feeding them to the chooks. This works best on the bigger but slow moving stuff like snails and slugs (ewww!), caterpillars, shield bugs or cockroaches (may be a bit fast...). The shield bugs are also called stink bugs for very good reason and the can eject a foul smelling and very irritating liquid when threatened so wear gloves and safety glasses if you are going after these buggers. I wouldn't feed them to the chooks either, drown them in water with a bit of soap or dishwashing liquid.

Catch and hold – These are traps that attract and hold pests such as the slug and snail beer trap, made by getting a glass jar and burying it until the lip is level with the

ground, then pouring in some beer diluted 50:50 with water, the snails and slugs are attracted, fall in and drown, but at least they die happy. There is also a bottle trap used with fruit flies that is described in another article on this site. Flying insect pests are attracted to red and yellow colours so a trap can be made by coating red or yellow cardboard with non-drying glue or molasses and then hanging them up where the pests are evident.

Barriers – by placing an obstacle between the pest and its target you can reduce the damage considerably. The barrier can take the form of a ring of irritant substance around a plant or plants to keep out slugs and snails such as wood ash, sawdust, lime, diatomaceous earth or alum. Care must be taken because some of these materials are soluble and can alter the pH of your soil, obviously they won't work to well in rainy weather either. Panty hose or paper bags can be placed around fruit including tomatoes and capsicums to deter fruit fly and fine nets can be erected against flying pests including birds.

Environmentally Friendly Chemical Pest Controls

The following chemical controls can be used in moderation and in association with the other techniques covered in this article to treat infestation of specific pests.

Pyrethrum spray (commercial or home produced) can be used on most flying and crawling insects. The pyrethrum daisy can be home grown and the active constituent pyrethrum extracted using water or alcohol. The addition of a small amount of sesame oil or sassafras oil will improve the effectiveness of the pyrethrum spray.

Derris dust – can be applied as a spray or a dust and acts as a stomach poison for chewing insects. There is some toxicity to humans although Derris will not build up in the environment so when applying use a dust mask or respirator.

Oil – either light mineral oil or vegetable oil can be sprayed onto plants for scale and other bugs, it clogs up their air holes and suffocates them. Spraying needs to be done in

the early morning or late afternoon and spraying in the middle of a hot day can result in burned leaves.

Bug juice – Yep, tastes as good as it sounds! Gather some of your target pest manually, mulch them up and place them in water, shake them around and then strain out the bits and spray onto the affected plants. For some reason bugs will keep away from plants sprayed with the innards of their relatives.....mind you, so would I.

Nicotine – soak a quarter of a cup of cigarette butts in a litre of warm water overnight, filter out the butts and add a bit of liquid soap or dishwashing liquid to help the spray wet out and bottle. WARNING: this is a nasty so use gloves when handling and don't inhale the spray.

11.2 Organic disease control

In a similar way to dealing with pests, if you grow fruit or veggies of any description it is likely that you will have to deal with disease in those plants at some stage. Dealing with diseases is different to dealing with pests in that diseases tend to be very specific to each plant and while some general rules can be formulated about preventing disease and dealing with the various causes of disease it is important to research and make sure the disease is correctly diagnosed before acting. It is not possible to cover all the possibilities in a short article like this one, so this is more an overview to help you gain an understanding of plant disease so you can then move on to further research.

Having said all that my experience with disease in backyard grown vegetables is fairly limited and while we have had the odd outbreak of blossom end rot in tomatoes mostly our disease profile is restricted to mildew of cucumber and zucchini and the odd occurrence of damping off. It's good to keep an eye out on what is going on but don't obsess about infected veggies, life's too short.

The Causes of Disease in Plants

In general terms plant disease is caused by viruses, bacteria or fungi and the most common cause of disease in your veggie crop is likely to be a fungus. Some plant diseases or disorders can also be caused by a lack of one or more nutrient elements or by excess of a particular nutrient to the point where they become toxic to the plant, usually due to incorrect soil pH. These nutritional disorders are touched on in the article on keeping up fertility organically by adding nutrients while this article will focus more on the biological causes of disease.

The Organic Approach (Prevention Rather than Cure)

Rather than go for short term bandaids in the form of disease control chemicals like fungicides (no matter how enviro-friendly) we need to look at our backyard crops as being part of our backyard ecosystem and then try to keep the ecosystem in balance. We can also be smart and avoid disease problems before they get to the point where a chemical control is necessary by using some or all of the following strategies.

- **Observe** your back yard veggie crops regularly for signs of disease and if you do, diagnose as best you can or get advice from other gardeners, books or the 'net and once the disease is diagnosed act accordingly. By identifying and acting quickly a minor irritation can be prevented from becoming a major headache.

- **Start with a healthy soil** – healthy soil means healthy plants and healthy plants means they are less likely to become a target for diseases. If you follow organic principles and use organic manures and fertilisers, if you mulch well, use green manures and maintain soil organic matter and avoid cultivating and exposing your soil to the sun you are much more likely to have healthy soil. Check and adjust your soil pH if necessary as well, as soil that is too acid or alkaline can be rough on the microbes in your soil as well as your fruit and veggies.
- **Mulching** – As mentioned above mulching will help improve soil health but aside from this mulch will prevent soil and spores being splashed up onto the plant during rain and reduce the likelihood of infection, particularly fungal infection, by this route.

- **Don’t overcrowd your plants** - allow room around them for good airflow although in my experience if you have healthy soil and are growing organically your veggies can be planted much more closely together without causing a problem than if your growing using chemical techniques. When planting the usual stuff in our backyard beds we generally use about 30cm spacing and that causes no problems, allowing separation of the plants and airflow when they are young and vulnerable but making good use of space when they are grown.

- **Plant resistant varieties** – The varieties of vegetables available today is very small in comparison to years gone by, even in plant nurseries the variety of seedlings is only slightly better than the stuff we can get in the supermarket. Fortunately there are specialised seed suppliers like Eden Seeds, Phoenix seeds, Greenpatch seeds and Green Harvest who can supply a broader number of varieties and some will be more resistant to than others to the diseases prevalent in your area.

- **Keep your growing area clean and tidy** – dying plants, rotting fruit and other organic material lying around and provide a place for disease to build up or even over-winter. Diseased plants should be removed from your site in the green waste bin or burned as the organisms may re-infect your veggies even if composted if unless your compost system is really hot. Don’t take the chance.

- **Hygiene** – Maintain your hygiene levels when raising seeds, potting on and planting out. Regularly wash all your flats, punnets, labels, trowels etc in a disinfectant solution like Dettol or one of the quaternary ammonium disinfectants to prevent a build up of disease organisms and get your seedlings off to a good start. Exposing your equipment to the sun will help to as the disease organisms generally don’t like the ultraviolet light (they have never heard of sunscreen I guess....).

- **Practice crop rotation** –by not planting the same family of veggie in the same plot two years running which not only helps maintain fertility in the soil it prevents a build-up of crop specific diseases in the soil.

- **Avoid overhead watering when possible** – because this raises the humidity and can cause fungal problems when the leaves stay wet for an extended period of time. If you water in the morning so that any excess water is dried off by the sun the likelihood of this causing a problem is reduced.

- **Don't water your veggies with greywater** – apart from the possibility of passing on human pathogens to the crops you will later eat, you may also pass on plant pathogens. Use greywater for watering fruit trees and apply direct to the soil or subsurface.

- **Plant at the correct time of year for the seed being grown** – forcing a plant to grow outside its normal season can reduce its vigour and cause it to become prey to disease as well as pests.

Control Options

Viruses – There are no real control options for virus infected plants but to "rogue" them ie pull out and remove them preferably by burning to destroy the virus. Do NOT compost them.

Bacteria – a double strength garlic spray may improve matters, Bordeaux mixture can be used on perennials

Fungi – seaweed foliar spray; milk, garlic and chilli spray, urine (use full strength and fresh!); chamomile tea; chive tea, sulphur or lime sulphur spray.

12.0 Resources

12.1 Links to eBooks

Upwardly Mobile with Vertical Veg

Growing Food Crops in Pots

Low Cost, High Efficiency Irrigation

Growing Veggies from Seed

Keeping the Place Fertile

Managing your Weeds Organically

12.2 Books

Indoor Kitchen Gardening – Elizabeth Millard – Cool Springs Press (US) 2014 ISBN 978 1 59186593 3 – This small book has lots of info about indoor gardening. Rather than getting stuck into growing it covers how to find growing space, getting started with indoor growing covering subjects such as soil, containers, artificial lighting and air circulation. The general stuff continues with details on common pests and diseases then moves onto indoor crops including microgreens and sprouts, mushrooms, wheatgrass, Pea, popcorn and sunflower shoots. The final section covers more conventional indoor vegetable crops. Glossy paper and lots of colour photos.

The Rurbanite – Alex Mitchell – Kyle Books (UK) 2013 ISBN 978 0 85783 072 2 – There are lots of ideas here on how to grow food in the city, from the soil up. Container growing is covered as well as seed saving, guerrilla gardening street gardening. Wild food and wildflower foraging is covered as well as raising chooks, quail, ducks and bees in the city. Lots of colour photos.

Paradise Lot (The making of an edible garden oasis in the city) – Eric Toensmeier - Chelsea Green Publishing (US) 2013 ISBN 978 1 60358 399 2 – This is the sort of book you read from cover to cover. It is the story of two guys who bought a duplex in the US city of Holyoke and proceeded to turn their shared backyard into a permaculture based, low maintenance edible garden. A great read! No drawings, but there are a dozen or so colour photos in the centre of the book.

The Quarter Acre Farm – Spring Warren (Yup, that's her name!) Seal Press (US) 2011 ISBN 978 1 58005 340 2 – This is another cover-to-cover read. The author wanted to grow 75% of their food on their suburban block. There is a fair bit of "this is how I did it" and recipes for your home-grown produce are included. We have used a couple of the recipes. She also talks about preserving, animals and eating the weeds. No photos just a few line drawings.

Veg Street – Naomi Schillinger – Short Books (UK) 2013 ISBN 978 1 780 72112 5 – This one is a bit of a coffee table book, lots and lots of colour photos but not hugely information dense. It is set out with each chapter covering a month (starting with January) and each month giving information about which plants can be planted and which can be harvested that month (for the northern hemisphere of course). There is also a small section called Community Corner covering ways of revitalising your community around growing things, a page or two on potting various plants and also a "simple but Brilliant Ideas" page. Good if you want basic information.

The Small Edible Garden – Diana Anthony – David Bateman Ltd (NZ) 2008 ISBN 978 1 86953 705 0 – A very small book too! (64 pages) It gives good basic information on setting up and managing a small food garden, including containers as well. Details on soils, watering, sowing and planting are covered with information on growing fruit, veg and herbs as well as organic management principles. Lots of colour photos, good basic info.

Vertical Gardening – Derek Fell – Rodale Press (US) 2011 ISBN 978 1 60529 083 6 – The book opens with a discussion of what constitutes vertical gardening and its advantages, moving from there into choosing your site and preparing the soil. This is followed by several chapters discussing the vertical gardening options (arches, pergolas, trellises, hanging planters etc.). Composting, seed starting, pests and diseases, watering pruning and fertilising (all organic) are covered and there is a section on fruit and vegetables suitable for vertical gardening. The book has some line drawings and colour photos as well as a fair amount of balck and white photos.

Vertical Vegetables and Fruit – Rhonda M. Hart – Storey Publishing (US) 2011 ISBN 978 1 60342 998 6 – The book is divided into 3 parts, the first part covers why you should garden vertically and the sorts of techniques used such as trellises, teepees, hanging, stacking, making towers etc. The second part goes into the details of growing annual vines vertically like beans, peas, cucumber and squash; and part three covers vertical growing of specific perennial fruit crops like berries, grapes and kiwifruit. There are no photos, but some coloured line drawings which work very well.

The Edible Balcony – Indira Naidoo – Penguin Group (AUS) 2011 ISBN 978 1 921382 53 6 – This is a great book! The main part is set up around the four seasons and what you can grow and harvest during that season and includes recipes. The great part of the book is at the front, where the author goes through how to plan and set up your balcony garden. Lots of great info, lots of colour photos too, and a few line drawings.

The Edible Balcony – Alex Mitchell – Kyle Cathie Ltd (UK) 2011 ISBN 978 1 85626 946 9 – As well as balconies, this one covers roof gardens as well. The technicalities of growing various crops in the city is covered including which are most prolific, which are easiest to grow, which do best in shady areas etc. Lots of colour photos.

The Edible Front Yard – Ivette Soler – Timber Press (US) 2011 ISBN 978 1 60469 199 3 – First the author goes into lots of detail on the sorts of crops that look good in a front yard, gives you a couple of designs and then shows you how to assess your own front yard. She takes you through how to drag your front yard back to scratch, what infrastructure you will need to put in and once everything is in, how to maintain it using organic gardening principles. Lots of information about setting up an under-used space to grow food. Lots of colour photos, but lots of how-to as well.

Ground Breaking Food Gardens – Niki Jabour – Storey Publishing (US) 2014 ISBN 978 1 61212 061 4 – This is not an in-depth how-to book. It is a very good ideas book though.

The book shows you 73 different garden designs with each design being described in two or three pages. Designs include edibles on a patio, vertical vegetables, an edible knot garden, 52 weeks of salad garden, an Elizabethan garden….the list goes on. No photos but lots of colour diagrams. If you want to grow food but have run out of ideas, this one is worth a look.

Little House in the Suburbs – Deanna Caswell and Daisy Siskin – Betterway Home (US) 2012 ISBN - This is a broad brush book that starts out with why you would want to live the productive lifestyle in the suburbs and moves through growing veggies, keeping chooks, mini goats and bees to preserving and making your own skin care and cleaning products. The authors also take you through improving community in your neighbourhood and finish off with a stack of appendices about planting plans and other resources. The authors also operate a blog of the same name. There are quite a few colour photos illustrating the how-to stuff.

Growing Food in Containers

From Container to Kitchen – D.J.Herda- New Society Publishers (CAN) 2010 ISBN 978 0 86571 665 0 – This one bills itself as the "complete guide to the no-yard garden". It covers, among other things, selecting the right container and location, optimising soil nutrients, managing light, water and humidity, choosing fruit & veggies and treating pests and diseases. While not being a big book, it has lots of good information. There is a group of colour photos in the centre of the book, with black and white photos scattered throughout the book where appropriate.

Grow Your Own Crops in Pots – Kay Maguire – Michael Beazley (Royal horticultural Society) UK 2013 ISBN 978 1 84533 686 8 – The book is broadly broken up into sections covering fruit, vegetables, herbs and edible flowers. The book starts with a discussion of general planting techniques, planning, nurturing and protecting your crops in pots. It follows with a comprehensive listing the plants in each section, how to plant them in containers and how to keep them happy. Each plant only gets a page or two but there are a large number of plants covered. Lots and lots of colour photos.

Permaculture in Pots (how to grow food in small urban spaces) – Julie Kemp – Permanent Publications (UK) 2012 ISBN 978 1 85623 097 1 – This book is also set out on the one-month-per-chapter principle. The stat of the book covers general principles and techniques of organic growing and permaculture. Then each chapter/month starts out with what is growing on her balcony that month and what food growing related things can be done during the month. Following is a few pages of discussion about a specific technique or project and the chapter is wound up with a page on the "herb of the month". Lots of colour photos.

Crops in Pots (Part of the "Green Guides" series of books) – Rachelle Straus – Flame Tree Publishing (UK) 2011 ISBN 978 1 84786 719 3 – This book has a small amount of information on a lot of subjects. It covers why you would want to grow food in containers, how to get started, what to grow and how to grow it,harvesting the produce, pests and diseases. There are also sections on the specifics of growing vegetables, salads, fruits, herbs and edible flowers as well as a section on frugal gardening. There are lots of colour photos.

Grow Your Own Vegetables in Containers (Also called "Organic Crops in Pots") – Deborah Schneebeli-Morrell – Cico Books (US) 2009 ISBN 978 1 907030 06 2 – The book starts out with general principles of organic gardening and how to get started and then goes into specifics of how to set up over 30 different types of gardens in pots. Some examples are sweet basil in a clay pot, red lettuce and shiso in metal tins, potatoes in woven sacks and eggplant in a rubber bucket. Lots of colour photos.

Urban Agriculture – David Tracey – New Society Publishers (CAN) 2011 ISBN 978 0 86571 694 0 – This is an ideas book with some how-to. It starts out with why we should care, turning your garden into a productive area, container gardening for condo's, adding food to home garden design, community gardens, community orchards and urban farms. There are colour photos in the centre of the book with some black and white photos and drawings scattered throughout the book.

Citizen Farmers – Daron Joffe – Stewart, Tabori and Chang (Abrams) (US) 2014 ISBN 978 1 61769 101 0 – Lots of good basic how-to in this one based around biodynamic principles and permaculture. There are lots of plant lists (top 10 annual crop for edible landscaping, top 10 plants for making compost, top 10 edible fruit and nut trees etc) and tool lists (tools for sowing, tools for tilling, tools for growing etc.). The tilling advice does not translate to Australian soils however. Lots of colour photos.

Lawns into Lunch: Growing Food in the City – Jill Finnane – New Holland Publishers (AUS) 2005 ISBN 1 74110 209 X – This is a collection of stories about people growing their own in the cities, with an undercurrent of Permaculture and sprinkled with hints and recipes. Inspirational as well as practical, this is a good one.

Fresh food From Small Spaces – R. J. Ruppenthal – Chelsea Green Publishing Company (US) 2008 ISBN 978 1 60358 028 1 – Even taking into account this is from the US it has lots of good info about growing food in the city/suburban environment. Some unusual things like mushrooms and fermented foods like kefir are covered as well as bees, chooks and worms. Well worth having.

Urban Eden – Adam and James Caplin – Kyle Cathie Ltd (UK) 2004 ISBN 1 85626 501 3 – Not vast amounts of “How To” but a very inspirational book that has some great ideas for small spaces.

Fabulous Food From every Small Garden – Mary Horsfall – CSIRO Publishing (AUS) 2009 ISBN 978 0 643 09597 7 – A great book that really covers everything you need to know to get the best out of your urban/suburban space. Mary is the ex co-editor of Grass Roots magazine, how can it get better than that?

The Apartment Farmer (The Hassle Free Way to Grow Vegetables Indoors, on Balconies, Patios, Roofs and in Small Yards) – Duane Newcombe – J.P. Archer Inc. (US)

1976 ISBN 0 87477 047 5 – If you can get hold of, this is a good one. Lots of info about growing under lights and in containers and good detail on individual vegetables.

The Edible Container Garden (Fresh Food From Tiny Spaces) – Michael Guerra – Gaia Books Ltd (UK) 2000 ISBN 1 85675 089 2 – Good general book on container gardening, how to make and use containers as well as details on individual vegetables, it even makes reference to Permaculture.

Grow Your Own Fruit and Veg in Pots, Plots or Growbags – Steve Ott, Emma Rawlings & Roxanne Warwick – Foulsham Books (UK) 2008 ISBN 978 0 572 03494 8 – This is set out as an A to Z guide to growing vegetables, fruit and herbs with 1 or 2 pages per plant including varieties, growing tips and recipes. Good for what it is bearing in mind it is written for the UK experience.

Successful Small Food Gardens – Louise Riotte – Garden Way Publishing (US) 1993 ISBN 0 88266 818 8 – Good for those with some land around them in the suburbs although it does contain a section on mini gardening for mobile homes. There is also a section on edible flowers and one on edible landscaping.

Grow Your Own Groceries (How to feed your family from your own back garden) – Linda Gray – Spring Hill (UK) 2009 ISBN 978 1 905862 31 3 – Good detail on growing and using veg, herbs, berries and edible flowers. Also covers egg production and use and some information on preserving the harvest.

Harvesting the Suburbs – Jeff Hodges – Nature & Health Books (AUS) 1986 ISBN 0 949099 02 3 – While not a lot of data on individual vegetables this book is inspirational and gives lots of good information on planning your productive backyard based around Permaculture principles.

The Complete Urban Farmer – David Wickers – Fontana/Collins (UK) 1977 ISBN 0 00 635096 8 – This book has good sections on planning you layout and improving your soil

as well as raising vegetables from seed, ideas for containers to grow in and storing, preserving and cooking the harvest.

Raise Bed Vegetable Gardening Made Simple – Raymond Nones – The Countryman Press (US) 2010 ISBN 978 0 88150 896 3 – everything you wanted to know about raising backyard vegetables based around a system consisting of three, four foot by eight foot raised bed modules.

Patio Produce – Paul Peacock – Spring Hill (UK) 2009 ISBN 978 1 905862 28 3 – Lots of good stuff about growing individual vegetables, fruit and herbs on your patio or small outdoor space as well as how to plan and get the best out of you patio farm. Obviously the section on the patio gardeners year needs to be adjusted to fit in with the seasons here in Aus.

A Little Piece of Earth – Maria Finn – Universe Publishing (US) 2010 ISBN 978 0 7893 2027 8 – A great little book covering growing fruit and veggies indoors, in window boxes, on terraces and balconies in borders, patios and pergolas. The book is unusual in that it includes section on rooftop gardening, foraging and community gardening. You gotta love it!

The City Peoples Book of Raising Food – Helga and William Olkowski – Rodale Press (US) 1975 ISBN 0 87857 095 0 – This is a great little book that covers the usual stuff like planning your garden, raising plants from seed and keeping up the fertility but then goes into some more unusual stuff like integrated pest management, roof gardening and community gardening. Another one to grab if you can find it.

Square Foot Gardening – Mel Bartholomew – Rodale Press (US) 1981 ISBN 0 87857 341 0 – Ground breaking at the time of its release, this book covers a system of backyard vegetable raising based on squares rather than row cropping. It is a comprehensive and detailed manual on how to make the system work for you. There is a companion volume by the same author called “Cash from the Square Foot Gardening”.

How to Grow More Vegetables* (*than you ever thought possible on less land than you can imagine) – John Jeavons – Ten Speed Press (US) 1979 ISBN 0 913668 98 2 – This is a manual on how to implement the Biodynamic/French Intensive method of growing vegetables in your back yard. It goes through planning and preparing your beds, fertilisation and composting, seed propagation, companion planting and how to develop a natural backyard ecosystem. I had some difficulties with the process but maybe my understanding was faulty. This has recently been updated and republished. There is also a simplified edition by the same author called "Lazy-Bed Gardening".

Escarole in the Bedroom (Growing Food Plants Indoors) – Jack Kramer – Little, Brown and Co (US) 1977 ISBN 0 316 50314 2 – As well as some good detail on how to grow individual food crops, this book provides some interesting information on areas to grow the plants indoors, using artificial light and what sort of containers to use.

One Magic Square (grow your own food on one metre square) – Lolo Houbein – Wakefield Press (AUS) 2008 ISBN 978 1 86254 764 3 – This is a wonderful book for the backyard food grower. Written for Australian conditions the author sets out a process of growing compatible plants in one metre square combinations, with lots of detail on each combination and individual crops. She also covers the why's and wherefore's of food self sufficiency and a whole stack of tips to make the process easier.

Incredible Vegetables from Self Watering Containers – Edward C. Smith – Storey Publishing (US) 2006 ISBN 978 1 58017 556 2 – This book covers how to make and use self-watering pots, what potting soil to use and which vegetables to plant in them to get the best yield. Although the emphasis seems to be on using commercial self watering pots, the data is good just team it up with the information on self watering pots on this site and you're away!

Vasili's Garden: from the garden to the kitchen Mediterranean style – Vasili Kanidiadis – Wilkinson Publishing (AUS) 2008 ISBN 9781921332340 – This is a fun book, good to browse through, set out in a section for each season, it gives tips, hints and recipes for

growing and using backyard veggies. It is very easy to read and was put together to support the TV series of the same name.

Vegetables for Small Gardens and Containers – Peter De Vaus – Hyland House Publishing (AUS) 1991 ISBN 0 947062 37 8 – This book covers location and planning of veggies, tools, crop rotation, preparation and planting, pest and disease control and harvesting and storage of your veggies. A good book for small scale growers and one of the first to cover container growing veggies seriously.