

Under the Choko Tree

Permaculture Zone Zero



By Nev Sweeney

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0.0 Introduction



Zone 0 before it was zone 0!

The concept of Zones in permaculture was developed by Bill Mollison and David Holmgren as a tool to allow areas of similar use, activities and frequency of visitation to be grouped together when developing a permaculture design. The idea for permaculture zones was laid out in the original book about permaculture - 'Permaculture One' and was conceived as a series of concentric circles (Zones 1 to 5)

starting at the area around the house (zone 1) and moving towards untouched wilderness areas (Zone 5). Each zone may be described as below –

Zone 1: Nearest to the house, for elements that require frequent attention, or be visited often, e.g., salad crops, herbs, soft fruit like strawberries or raspberries, greenhouse and cold frames, propagation area, worm compost bin for kitchen waste, etc.

Zone 2: Farther from house the place for perennial plants or self-maintaining plants and elements needing infrequent work: mulching, pruning bushes, orchards, compost area, animals eg. poultry, rabbits, worm farm, bees

Zone 3: Occasionally visited areas where main crops are grown, for domestic and for trade use. After establishment, care and maintenance is fairly minimal e.g., watering or mulching once a week or so. Self-fed animals (stock), seasonal crops e.g. corn, wheat, rice, pumpkin, bamboo.

Zone 4: Semi - Wild food gathering (e.g. nuts, native fruits, mushrooms) wood for Fuel, Self-seeding trees, soil microbes semi-wild. This zone is mainly used for forage and collecting wild food as well as timber production.

Zone 5: Wilderness area: a rarely visited area often linked with neighbouring wildlife corridors. Sometimes managed to reduce risk of catastrophes i.e. fire/pollution/drought/hurricane. There is no human intervention in Zone 5 apart from the observation and enjoyment of natural eco-systems and cycles. Here is where we learn the most important lessons of the first permaculture principle of working with nature, not against.

In the original “Permaculture one” and “Permaculture Two” there was no mention of a Zone 0, this came later and is referred to in Bill’s seminal work “Permaculture: A Designers’ Manual”. Zone 0 may be described as –

Zone 0: Home: indoor production (sprouts/ferments), processing food, waste, water & energy collection, repairs and education, relax, work and where you practise reduced consumption and re-cycling. This eBook focusses on our Zone 0.



Back in the day

We have been in our zone zero for over 40 years, and it is a child of its time, ie the ‘70s. It is a brick veneer and concrete tile roof home, with a floor area (house only) of 110m² and relatively large aluminium windows (see above). There is some asbestos in the bathroom (since removed), the laundry and under the eaves of the house as well. Fairly early on we had a garage installed directly beside and sharing a wall with the house adding another 24m² under roof.

It is a fairly basic house with a Lounge room, kitchen/dining room, laundry, bathroom with separate toilet and three bedrooms. The front of the house faces a little south of east, and thus the back faces a little north of west, which means the whole back of the house has always been exposed to the full fury of the western Sydney sun in summer. This is one reason I would like to have a discussion with the designers, the other is that while there are large windows at the front and rear of the house, there are no windows in the north wall to admit winter light or in the south wall to admit cool southerly breezes in summer. Still, you have to make do with what you have!

The house had no insulation when we bought it and for a while we thought we had bought ourselves a solar oven! This was remedied within two years by the installation of glasswool insulation in the ceiling. The brick and tiles are both dark in colour, increasing the summer heat gain as well.

Over the years we have laboured to make the house into a comfortable, energy efficient and productive space, with varying degrees of success. This eBook outlines some of the features we have installed to support our journey towards a more sustainable lifestyle.

1.0 The Kitchen

Why should the kitchen be first?

- The kitchen is a high energy use area (cooking, fridge & freezer, hot water, heating & cooling etc.)
- Up to 18% of water is consumed/turned into grey or black water in the kitchen
- Almost all the material we compost comes from the kitchen
- Much of the material we recycle comes from the kitchen
- The kitchen is the heart of the home.

But what does the term 'sustainable kitchen' mean? To me it is a kitchen that encourages an environmentally friendly lifestyle by -

- Making it easy to compost
- Making it easy to recycle
- Having space for bulk food containers
- Being equipped with energy saving appliances and lighting
- Being set up to save water
- Being productive in and of itself and,
- Inviting you to cook!

If you are starting from scratch you can design and build your own version of the perfect (sustainable) kitchen, but we (like the majority of people) have to make the best of what we already have and optimise it by retrofitting. That will be the focus of this article.

So let's look at each of the aspects which are set out above –

1. Making it easy to compost

This is essentially providing a container where organic materials can be stockpiled before being taken out to the composter/worm farm/chooks or wherever without chasing you out of the house due to the smell. The issue is how big the container needs to be and that will be governed by how much organic waste the kitchen produces and how often you want to head for the composter! One of the side effects we found when we started eating more out of the back yard was that the amount of rubbish we produced decreased considerably, but the amount of compostables we produced increased considerably.

There are a number of ways we have done this over the years, the most low tech one being the old 2 or 4 litre plastic ice cream container with lid, and we have used that approach on and off. We have also tried purpose built bins of varying sizes and materials. Recently we have come across what I believe to be THE answer, or at least the answer for us – a Bain Marie tray with a lid. I got the idea by accident, we had bought several to use making biochar but I had one too many and it was a bit small, so I pressed it into service as a compost container and it has turned out to be perfect, for a number of reasons –

- They are readily available from catering suppliers, ridiculously cheaply for what they are (the one I am using cost us about \$20) and available in a multitude of sizes.
- They are made from stainless steel so they are easy to clean, easy to disinfect and they last forever! (unlike any of the plastic containers we have used)
- The rounded sides mean that there are no edges or seams to accumulate yuck and cause rust like happens with the more conventional cylindrical mild steel bins.
- Being rectangular they make it easy to scrape vegetable matter directly off the cutting board into it.
- They would also be available second hand from restaurants/eateries closing down.

It would also be possible to set one up in a drawer (assuming you have a spare drawer) if you got the right size. The only downside so far has been the dish in the lid so you can get your hand under the handle to lift it up, which takes a bit of space from inside the container, but all up it has been a winner for us so far!

2. Making it easy to recycle

The way we have found works best for us is pretty simple. Years ago I put up some hooks to hold hats and brooms and stuff near the kitchen/laundry doorway and we have a capacious (AKA big) bag hanging on the hook closest to the kitchen door. All recycling gets cleaned out (if appropriate) and then tossed into this bag. Approximately once a week we drag the recycling bin over near the front door, drag the recycling bag onto the front landing, then toss from one to the other, making sure that any recycling with our names and/or addresses has been removed as a precaution against identity theft. Bingo! Works for us.

3. Having space for bulk food containers

One aspect of trying to live more sustainably is to reduce the amount of packaging we bring home and then have to either dispose of or recycle. One way we did this was to look at the sorts of foodstuffs we were buying and then identify and pursue packaging free alternatives. Buying in bulk can not only reduce food packaging we dispose of but can also save us money



and increase our resilience, so it is a winner on all fronts. But we do have to be able to manage the supplies so we don't inadvertently run out, or have them become unusable due to age or infestation.

We have been working over time to reduce the packaging we throw away by buying in bulk, buying packaging free, and growing/ producing our own. For the big stuff that we go through quickly or has a long shelf life such as whole wheat, bakers flour, powdered milk, rolled oats, white rice etc have 20 litre polypropylene buckets with an airtight lid. These are generally stored in the laundry or the garage or a shed. For the day-to-day usage of the bulk stuff, we have large glass jars in the kitchen cupboards. We also have various sizes of glass jars from large ones we keep a good supply of things like red kidney or black beans, going on down through medium jars for things like nutritional yeast, dried onion and dried garlic to small jars for homemade curry and spice mixes, Italian herb mix and mixed herbs.

Some of the jars are recycled, particularly ones 500grams or less, but the larger ones (up to 3 kilos capacity) had to be bought in specifically, but they should be in use for a long time, seeing me out at least! We store them in and on various cupboards around the kitchen and dining room and I must admit I like seeing them there, for me they give the place a homey feel. But, it is a journey not a destination and we will continue to investigate sustainable food storage options into the future.



In terms of cleaning products we try to use materials like bicarb and vinegar, bought in bulk, for cleaning purposes with one glaring exception. Years ago we tried using a soap saver for washing the cutlery, plates and glasses etc. but found that the soap had a nasty habit of making the things we were washing up very slippery, and after we lost a couple of plates through being smashed on the floor, we went back to dish washing liquid. We do buy a 25 litre drum from a local supplier and refill squeeze bottles we have under the sink, which cuts down on cost and packaging considerably.

4. Being equipped with energy saving appliances and lighting

Generally speaking the appliances in our kitchen are designed to cook or to cool.

We have the usual stuff for cooking, a microwave and a gas range, but cooking for us can happen in a number of rooms of the house, or even out in zone 1.

Generally the way we work our cooking is that in summer we use our solar power system to power an induction hotplate and in winter we use the cooktop or oven in our wood heater to cook. If it works out that neither of those will do the job, the gas stove gets pushed into service, especially if it is late or I'm tired. Otherwise we do have other low/no energy appliances to help us cook including a couple of rocket stoves, a solar oven and a stored heat cooker (ie haybox cooker). The microwave is usually pressed into service to thaw or reheat previously cooked food again, using power from the solar panel/battery system. Also

with the advent of our solar electricity system, appliances we got rid of years ago, have come back into use, particularly the slow cooker (crockpot) and rice cooker are very versatile and see frequent use in our place.

All in all the systems we have in place give us flexibility in how we cook to make the most of the energy source available at the time. This also increases our resilience, because if one system is offline, we can substitute it with another.

In terms of cooling, I would love a cool cupboard where cool air is pulled up from underneath the house, through a series of screened or perforated shelves and expelled through a solar chimney on the roof. Unfortunately we are not there yet. Prior to our present solar electric system, we had a 12 volt fridge which operated from the previous solar system (one half the system ran the lights, the other half ran the fridge). The fridge was a commercial fridge modified with a 12 volt danfoss compressor by a friend of mine. Our current fridge is an efficient, but conventional fridge (no freezer section), backed up by a chest freezer in the laundry.

The lighting has evolved over the years as our solar electric system has evolved. Starting out with a conventional caravan style festoon light which was very inefficient and really only provided enough light to move around, great for power outages but not so much for everyday use. This was superseded by caravan (el cheapo) fluorescent lights which provided more light but tended to burn out the poor quality tubes quickly. They were in turn superseded by (expensive) high efficiency fluorescent lighting which were great for everyday use, but still expensive, through to the LEDs we use today. All our lighting is still 12 volt, but fed by the new system direct from the 24 volt batteries through a 24v to 12v converter. We have an LED downlight over the stove and one over the sink, with two more over the dining room table next to the kitchen, to provide extra light on that side if required.

5. Being set up to save water

The water used in the kitchen is mainly from the kitchen sink, although we do have a dishwasher it is in the laundry. With there being only the two of us, it takes time to make up a load for the dishwasher, but it is much more water efficient to do that rather than do a series of small hand washes every day. The dishwasher (a Bosch) uses about 10 litres per load on our usual setting, which equates to 3 – 4 hand washes whereas each hand washed load we do would probably consume 15 litres by itself. The extra energy consumed is not an issue due to the solar energy/battery system providing the electricity for free.



To make the best use of water coming out of the kitchen tap we capture it for applying to the garden outside and to accomplish this we have gone super low tech, ie we use a bucket. The bucket sits in the sink and any water used for rinsing dishes, when peeling veg or waiting for the hot water to show

up etc goes into the bucket and is then transferred to the garden. It is an el cheapo rectangular mop bucket but does a wonderful job.

When we first started out on this part of the journey I got hold of a sort of sink-within-a-sink that sat inside our kitchen sink and could be filled up, then removed to transfer the water for use elsewhere. Unfortunately it had a couple of shortcomings – it had a plughole/plug in the bottom, which leaked, and because it was so wide but shallow, when you lifted it out of the sink with more than a bit of water inside it became quite unstable and had a tendency to slosh the water out everywhere while it was being transported outside. This resulted in water all over the floor, the carpet, the cat, me.... You get the picture. So for a quarter the cost we picked up the bucket, and haven't looked back.

6. Being productive in and of itself

The kitchen is where we cook up our food but that doesn't mean it can't be productive in its own right. Our kitchen faces west, but is covered by the back deck, which provides lots of shade, so we don't get a lot of direct sunlight to grow even herbs on the windowsill. What we do use the kitchen space for is growing sprouts, particularly mung bean sprouts in a lunchbox, which needs no direct light. We also use the windowsill to green up soil sprouts which don't require direct sunlight either.

7. Inviting you to cook

This one is a bit more difficult because it depends so much on personal preference, but obviously two metres of kitchen bench space and a microwave is not exactly inviting to cook

up that seven course banquet! Our kitchen is not big at 2.7m x 2.9m, which is why the dishwasher and freezer reside in the laundry. In that kitchen we have 2 square metres of bench space, about 0.6 square metres of sink/drainage (plus associated under storage), a fridge and a stove, plus one half size and one full size pantry style cupboards . Needless to say there is not much room for 2 people to cook but it is quite well put together for one person and I find that it is, for me, a very inviting space to cook in.

The advantages of the smaller kitchen are that it is not big enough to contain much extraneous rubbish, and everything is near to hand. There is a world of kitchen gadgets out there but we confine our purchases to multipurpose kitchen gear, it is surprising how many of those kitchen gadgets they advertise are easily replaced with a sharp knife! It is also much quicker and easier to clean.

2.0 The Dining Room

I must admit that when I started this series I figured I would probably not do the Dining room as a separate section, but when I thought about it and considered some of the activities that have taken place in this room over the years, I realised it really is a multipurpose space.

The room is not huge at 3.0 metres by 2.6 metres and it shares the output of our one small aircon with the kitchen. It has one 240v pendant light in the middle of the room, and the more often used two 12v downlights over the dining room table. The large dining room window faces (like the house) a bit north of west and has a bamboo blind covering it outside to prevent the sun shining in as it sets in summer.

Some of the purposes it has fulfilled over the years include –

Eating Place/Meeting Place

First and foremost I guess, the dining room is a place to eat. We started out with the archetypal laminex dining room table and four tubular steel and padding chairs donated by a relative, so common in the '70s and earlier. But before long we were able to get a solid wooden table and bench seats which easily seat six, made by a local craftsman in St Mary's. The original design was for an outdoor table but we requested some changes, which he was happy to do, mainly around the table top being one piece rather than three boards with a gap between. It was pretty big and it was only after we got it home that I realised I would



have to take the front door off to be able to get it inside!

A Bygone Birthday!

That table has been sitting where it is now in the dining room for over 40 years. It has been the setting for endless family meals, celebrations and

general get-togethers over that time. It has been where we have crafted, played games, studied, had meetings, both family and otherwise. All manner of things have been consumed off it, and discussed around it. It has been the centre of much of our family life and when we pass on and leave it to somebody else they will be getting a table with history!

Kitchen work Overflow Area

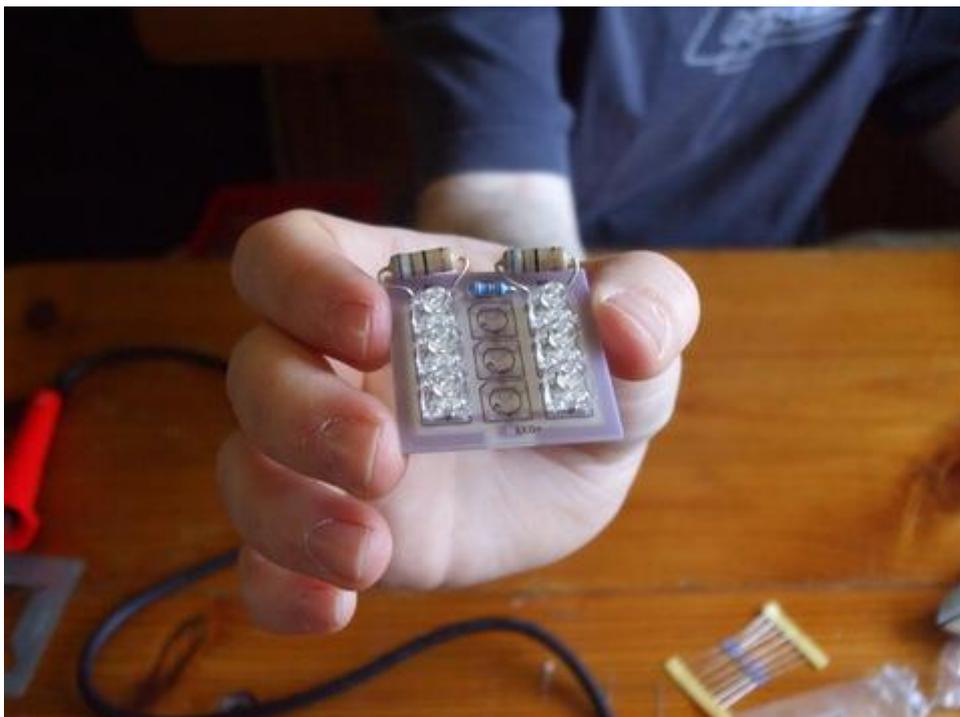


Being close to the kitchen area but not actually in it means that it can be used as a work area/set up area when making food. This particularly so when attempting some of the more space intensive (for us) activities such as pasta making, preserving, and some baking. I used to cook on

the dining room table with a kero primus so I could use a traditional mild steel wok before we got the stove with a wok ring. Even now we have a small electric oven sitting on the table which we power with the off grid system for smaller dishes so we don't need to fire up the gas stove.

Workshop/Work area

I am lucky in that we have a garage and a spacious area to work in, but when I lived at home we did not have the luxury of a garage, or even a shed and so the dining room table became the main work area. Tools and materials could be laid out, repair work and small



construction projects carried out. I have even seen a set up for a demountable vise, which would improve the ease of working considerably. Even with the garage I will still carry out light repairs to household stuff on the kitchen table because it

is more convenient, such as fixing the TV when it went kaboom.

Storage



There are some kitchen bits and pieces like our pasta making equipment, preserving gear and fancy plates etc for which we don't have space for in our small kitchen. There are also some bulk food items stored in the dining room as well, that way they don't clutter the kitchen but are in reasonably easy reach when cooking. The kitchen dresser also was an early purchase which over the years has proved valuable in containing kitchen overflow.

Music room

I am not musical (just putting that out there)! However, Linda is, and years ago I was able to get her an upright piano. She practices regularly when she has time and is getting quite good at it. Unfortunately, while the piano had a place for candle sconces to go on the front to allow playing by candlelight, it was not fitted with them when we bought it. A few years later I was able to find a pair which fit in an antique place in Windsor so it is now complete. The only place where the piano would fit, of course, was the dining room so it also doubles as our music room!



Garden Work

Yup, even with a garage and greenhouse, I find it easier to sow the seeds into punnets and pot the seedling on into newspaper pots, which I do every two weeks, on the dining room table. It is more comfortable and certainly warmer/cooler than working outside, depending on the time of year. I bring the seed raising mix and some 8-cell punnets in from the greenhouse and the seeds down from my office and sow them all according to my sowing plan. After that I lay out and cut the paper and then form the strips into newspaper pots for potting on. I then fill them with seed raising mix and pot last fortnight's seedlings on into them at the dining room table. It is then a simple matter to take the filled punnets and newspaper pots back out to the greenhouse to continue growing.



Extra-curricular Activities

We live a hands-on life, doing stuff that I don't think was envisioned by the original designers of the house. Over the years the dining room has provided space that was not in

the direct living area but is close enough so that anything needing it can be kept an eye on. Also it was kept warmer/cooler than the outside environment and has allowed me to do some comparatively strange things including brooding chicks, fruiting mushrooms and raising crickets, all in a suburban dining room!

The dining room is a part of our zone zero, a multipurpose and very useful room which should not be neglected when reviewing what we do in our house.

3.0 The Laundry

As mentioned in the section on the kitchen, the laundry does take some overflow from the kitchen in terms of functionality. It is not a big room but currently stores our bulk food in 20 litre buckets, has the bag our recyclables go in hanging from the wall and it is also where the dishwasher is located. But we have also managed to fit in some other stuff too into its 1800mm x 3000mm innards!

1. The Freezer – while this was originally bought in to preserve the meat supply, these days we use it to hold other stuff. It is a chest freezer, and while it is not as easy to keep track of what is in a chest freezer they are more efficient because you don't get all the cold air falling out like you do as soon as you open the door of an upright freezer.

We find it very handy for holding stuff like bulk rolled oats, it not only keeps them fresh and extends their shelf life so we can buy a 25kg bag and work off that but it also prevents the whole bag going solid with pantry moth webs and grubs during the warmer months. I hate pantry moth! We also cook up several kilos at a time of legumes like red kidney beans, black turtle beans and chick peas, then freeze them in 250gm to 300gm portions which is roughly equivalent to a drained can. We can then just thaw and use them without having a stack of cans to recycle!



Washing machine, dish washer and freezer, all in a row!

We also use it for bread, rolls etc, whether we make them or buy them. If left in the bread keeper until we use them, they will inevitably just go fungus, especially in the warmer months and I hate the taste of penicillin! Freezing the bread means we eat it all, but the composter and the chooks miss out.

2. The dishwasher – this obviously is a carryover from the kitchen, but it resides in the laundry room and as I mentioned in the kitchen article “With there being only the two of us, it takes time to make up a load for the dishwasher, but it is much more water efficient to do that rather than do a series of small hand washes every day. The dishwasher (a Bosch) uses

about 10 litres per load on our usual setting, which equates to 3 – 4 hand washes whereas each hand washed load we do would probably consume 15 litres by itself. The extra energy consumed is not an issue due to the solar energy/battery system providing the electricity for free.”



Output from both the washing machine and dishwasher into the sink

While it wouldn't fit in the kitchen anyway, one plus of having it in the laundry is that it can be

included in the laundry greywater system which I will cover in the discussion about the washing machine. While it is possible to treat the greywater coming out of the dishwasher through the system, it currently isn't because I am concerned that the alkalinity of the dishwasher greywater may be a bit high for it to cope with. I am researching homemade alternatives under the caveats from my sweetie that anything I come up with –

- a. must effectively clean the dishes etc, and
- b. must not bugger the dishwasher!

The search continues!

3. Washing machine – We used to have a top loading washing machine, and I just used a hose of the required diameter connected to the end of the washing machine waste water outlet to run the greywater out onto the lawn. However, as we all know, front loaders are more water efficient, so that when it came time for the top loader to meet its maker (or the metal recycler) we bought a front loader. This was not without its own issues, however, as we were putting in the same clothes and washing detergent, but it was using less water – therefore the concentration of pollutants would be higher! QED!



Valve to run laundry effluent to constructed wetland or waste

So, rather than run the greywater from the new machine out onto the lawn directly, I built a constructed wetland to treat it first. The water exits the hose from the machine into the laundry tub as a holding tank, and from there it moves slowly via a flexible hose into the constructed wetland. It has certainly cleaned up the greywater from the washing machine, even dropping the pH down from 9.6 to 7.4, so it was able to be run onto the ground under some citrus trees. This proved to be very handy during our recent drought.

The Other stuff - There is not much else in the laundry (there is not much room) but there is a cupboard which holds laundry

stuff, soapmaking stuff, catfood stocks, some of our preserves empty preserving jars as well as other miscellaneous bits and pieces.



The constructed wetland

The Room Itself – Along with the rest of the house, the electricity supply for the laundry is generated by our collection of solar panels and stored in batteries and supplied through the inverter and the lighting is 12 volt, supplied directly from the batteries. When the weather gets hot, a door snake goes to block off the area under the door to keep the western sun out, the polystyrene foam window shield is installed, and we shut off the laundry from the rest of the house with a blanket across the doorway. We used to have a door there but it kept getting in the way so I took it off.

One thing I want to investigate in the future, in the roof above the laundry is the old

unused 300 litre hot water tank and I want to talk to a plumber about running a pipe to the laundry sink from it, and having some way of filling it with tank water. I could then use rainwater for some laundry operations. I suspect it might be expensive though.

4.0 Bathroom/toilet

In many cases the toilet and bathroom are one unit, but in our house they are actually two rooms, and having grown up in a house where they were both in the one room, I found this to be much more suitable arrangement! We also had the bathroom and toilet remodelled about 10 years ago which gave us some options around water saving and re-use.

The Bathroom

Our bathroom is not a huge room at 1750mm x 2400mm or equivalent to 4.2 square metres in area. In it there is a bathroom cabinet with a sink, and a corner spa with the shower over it, and not much else! According to Sydney water, 24% of water is used in the shower, so this was something we wanted to address and when we had the bathroom remodelled and the old bathtub removed (and turned into a water garden where we grow our water chestnuts) I asked for a specific modification.

That modification was to include a valve in the drain from the bottom of the spa which would allow me direct wastewater from the spa into the centre of the banana circle we had constructed in the back yard or to waste as required.



A bit convoluted, but that's how the shower water gets to the banana circle!

The shower nozzle which was installed with the spa turned out to supply 19 litres per minute, which I was not aware of at the time. After some years it started to fall apart and I needed to replace it. In my researches I was able to find a low water use (9 litres per minute) shower head which I duly bought and installed. The change was immediately obvious. When I did the original install on the waste water line out into the back yard, for good or ill, I used 25mm hose as the conduit for the water and while showering there was a tendency for water to build up in the bottom of the spa. I really didn't think too much about it, it was just a bit of an inconvenience that's all. When I installed the new low water use shower head, that build-up of water stopped and the existing drain was able to easily cope



with the shower greywater removal. This was a very visual demonstration that even though the water flow didn't seem much different than the original it had been measurably reduced!

The low flow shower head

Yes, I know you are going to moan at me "a spa? Really?". Yes they do use considerably more water than a standard bath if you want to fill them up, but our reality is that it usually only gets used on the hottest days of the year when we are sheltering in place. The spa in that case forms a comparatively cheap swimming pool which we can use and then give the waste water to the bananas! They are always grateful.

Another (minor) water saving fitting we have installed on the shower is an easily operated on/off inline valve between where the water supply comes out of the wall and where the shower hose connects to it. The idea is that once you get your hot/cold water mix right, if you want to shut the water off for any reason, say to apply shampoo, massage in conditioner or whatever you just shut it off with this valve. When you turn the valve back on your water mix is maintained and you don't need to waste water rebalancing the hot and cold before you can use it.



The in-line valve

We have also recently installed lever style taps on the bathroom sink. We find they give us better water flow control and are easier to turn on and off, particularly when washing our hands, which we seem to be doing quite a bit of lately.

The energy to the bathroom is primarily solar, with hot water coming from an evacuated tube solar hot water system, and the main light being an LED downlight supplied from the remnants of the old 12 volt system, now integrated into the new 24 volt system. There is a fan/heater/light installed which the new system runs through the inverter without difficulty although mostly it is the LED which we use for lighting.



While we have done pretty well growing vegetation along this part of the back of the house to protect it from the harsh western sun on those hot western Sydney afternoons, there are times of the day when the bathroom and toilet

windows are quite exposed. For these times we have polystyrene sheeting which is cut to fit the inside of the window surround that fits in and reduces the problems considerably. We applied some contact to dress it up a bit!

We do make some of the products which we use in the bathroom including [deodorant](#) and [shampoo soap](#). I have not found a home made toothpaste I am really happy with, the usual go-to sodium bicarbonate results in a (for me) unpleasant saline taste. I did come up with a [toothpaste](#) built around a calcium salt like calcium carbonate but I feel it could be better. Most cleaning and disinfection is done with vinegar and bicarb.

The Toilet

The toilet is also quite small at 1500mm deep by 900mm wide, and it has..... The toilet! Prior to the remodelling the toilet had a single flush 10 litre cistern. We had installed a 2 litre drink bottle filled with water to reduce the flush volume but it still used more water than we wanted. During the remodelling we had the old toilet replaced with a new ceramic 3 litre half flush/6 litre full flush cistern. We have always practiced the “if it’s yellow, let it mellow.....” thing and still do today.

The only other feature which sets the toilet apart is for entertainment more that anything else and it was one of the first modifications I made to the house after we moved in. I painted the inside of the toilet door with blackboard paint! With a selection of chalks placed on the cistern, it is endless fun for all the family!

5.0 The Lounge Room

The lounge room is where we spend a fair amount of time in the evening, particularly seeing as this is where (or near where) the primary source of heating and cooling for the house is, and as such it is part of our [cool refuge](#) and (if there is such a thing), warm refuge.

Heating and Cooling

Our main heating is provided by the Nectre bakers oven which is very efficient, especially after having an open fireplace as a source of heat for many years, although the open fire place was augmented by a since passed on kerosene heater. The baker's oven also allows us to cook on and in it, so that the energy from the wood we burn does double duty. The oven is also used for dehydrating food for storage and we are currently working on a system to transfer heat produced in the oven into the bed to provide warmth in that area when we leave the warmth of the fire to head up to the cooler bedrooms.



The lounge area, as part of the whole house, has fibreglass batts as insulation, but in winter we apply bubble wrap to the very large lounge room windows. This acts as a type of insulation (sort of like double glazing) but at the same time it lets in plenty of light during the winter day which we find very useful from a psychological as well as environmental point of view (we don't need to use extra lighting during the day. We also have roll down shutters fitted on the outside of the front windows (including the lounge) which cuts down on the heat getting in and we don't miss the light so much in summer because we get plenty at other times!

In terms of cooling, there is an overhead fan in the lounge room, but the main cooling (when it is required) comes from the small air conditioner in the Kitchen/Dining area, which is positioned so that the output can be directed into the lounge area as well. We have a fan which we use in the large doorway between the lounge and kitchen/dining area which picks up the cool air and directs it into the lounge.

The lounge room can be segregated from the rest of the house by a concertina door at the arch between the hall/entryway and the lounge room, which facilitates keeping the room comfortable in both hot and cold weather. There is also a folding door between the kitchen



and the hall/entryway and we use a blanket curtain to isolate the kitchen/dining area from the laundry, shutting off the whole south end of the house to keep it warmer/cooler as required.

Electricals

The main lights in the lounge room are two 12 volt high efficiency fluorescent lights, which are connected directly to the 24 volt batteries through the 24 volt to 12 volt converter, which means that even if the inverter shuts down due to low voltage, we still have the lights. The 240v ceiling fan is connected in where the old 240 volt light was placed. We also have a portable, stand mounted 240 volt fluorescent lamp connected to the off grid system through the inverter for task lighting.

We have the TV in the lounge room, we use it to watch YouTube videos on stuff we are interested in as well as my old 50s/60s sci fi and monster movies on DVD or on the net or other entertaining stuff. What can I say? We have optimised the TV power consumption to the

point where it only uses 10 watts to run, so power usage is minimal. If you type 'optimise' and your TV brand and model into the net, you would be surprised at the information available on how anybody can set up their TV to consume less power.

Accommodation

The 4 person custom built lounge which we have is also a remarkably comfortable fold out double bed. We also have two reclining chairs which can also be used for sleeping in, and both of us have, at separate times, slept in them when uncomfortable or unwell. This means that when required we could easily and reasonably comfortably sleep four people in our cool/warm retreat, and that doesn't account for floor space!



Three bookshelves full of books, a small CD player and collection of CDs and a solar/wind up radio rounds out the entertainment section of the room.

When we first moved in, I had the lounge room floor sanded and coated, and for many years we had a variety

floor coverings but the past few years we have gone with just the polished boards for the

ease of cleaning. I was initially concerned that it would make the room colder in winter, and even had plans to insulate under the floor for a while, but it doesn't seem to have made a difference to the feel of the room so I have decided to leave it as it is.



6.0 The Bedrooms

When the kids were living with us, the bedrooms were..... bedrooms! But since they have moved out, as tends to happen, the rooms pick up other purposes.

Common factors

All three bedrooms have a number of similarities; they are not particularly large with the master being 4 metres square and the two kids bedrooms being 3 metres squared. Each bedroom has its own aluminium window with the two front bedrooms having larger multi-pane windows (1800 x 1700mm) and the rear bedroom having a smaller window (1800 x 1200mm). The two front bedroom windows have roller shutters on them, but no windows on the back have a roller shutter so the back bedroom window is fitted 15mm thick polystyrene sheets which can be installed on very hot days to help maintain the room temperature.

For cooling, each room has a three speed fan in the centre of the ceiling (240v) and lighting was previously provided by one 12v high efficiency fluorescent light. These seem to have a limited lifespan, although it may be in excess of 10 years, but when they fail it is the whole light which blows rather than just the bulb, so they are being replaced by 12v LED downlights as they fail. There have been two 12 LED reading lights over the head of the bed in the master bedroom for many years.



Individual Rooms

Master bedroom

This is pretty much a standard bedroom with mostly just a bed and clothing accommodation. For winter heating there is a small 'Godin' slow combustion stove, which we had fitted when our eldest daughter was born. The flue was installed such that it went through the wall into her bedroom, thus heating two rooms with the one appliance. We don't seem to use it these days.

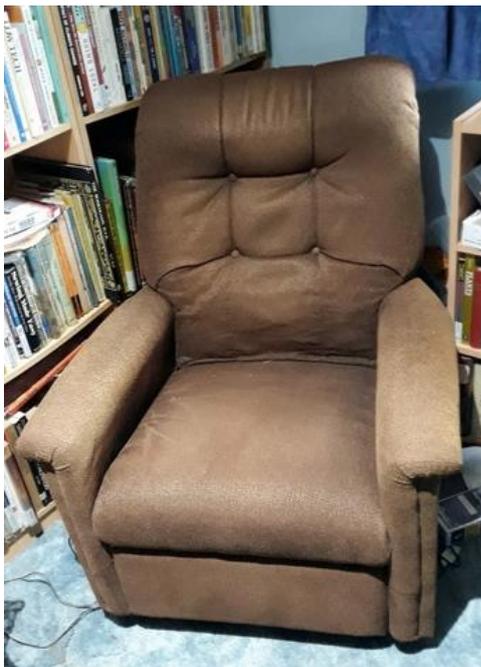
We don't use electric blankets in winter, more detail on that can be found [here](#).

Second Bedroom

This has been taken over by Linda as her office/sewing room/ library. Over the area which she uses as her office and where the computer is located is a bunk bed. The bunk bed can be used by visitors or if one of us is sick and doesn't want to infect the other, or if one of us is sleeping restlessly. Plans are also in the wind to make and install a fold down bed under the bunk to provide extra sleeping accommodation for visitors if required.

The northern side of this room is covered pretty well by the large mulberry tree in the front yard, this has two effects, the first one being that it keeps this end of the house and this room in particular quite cool in hot weather. It also provides a nice outlook, the window facing out onto the 'park' area and providing a good view of the self-watering bird bath. Due to this and other foliage in the front yard, you are not looking directly out onto the neighbours which is nice.

Third bedroom



This is my office/library area and has bookshelves on all four walls. There is also a recliner in the corner as a reading chair, although it is very comfortable and has been christened the 'sleepy chair', which I have been known to retire to if I am having trouble sleeping. It could also be pressed into service as sleeping accommodation in the event it was needed.

The Sleepy Chair

The window is protected from the afternoon sun by a passionfruit vine, mandarin tree and, as the sun swings around, the banana circle. The outlook is mostly foliage and quite pleasant!

7.0 The Back Deck

The back of our house faces west (or at least slightly north of west) and when we first moved in it had no insulation. When I thought we had bought a house what we had in fact bought was a solar oven!

First on the agenda was insulation, then I needed to put up a deck to act as a barrier between the kitchen and dining room space and the hot western Sydney sun. The first one I built many years ago and with somewhat less knowledge and skill it turned out to be not so ideal. I took it to the width of the back landing and it should have been wider, some of the timber used, while being recycled, was not up to the task and it did not cover the back door very well.

It eventually got to the point where all of the superstructure was gone, leaving just the deck itself, which if nothing else, supported the outdoor section of the split system aircon. I set up a tarp on occasion to cover that area but I really needed a new, proper deck. Some four or five years ago after much encouragement and motivation from my sweetie I designed and built the new deck and since it has been built we have found to be a great multipurpose space. It fills for us the following needs –



1. Sun

Protection - The original idea was to protect the back of the house and it does that admirably. The roofing is clear polycarbonate, but that is covered with 2 layers of 90% shade cloth so that the deck is protected from the summer sun, but the covering can be removed

to give us access to the warmth of the winter sun. There are bamboo blinds along the outside edge of the deck which prevent the sun from hitting the deck directly when rolled down. The sun does sneak past the southern end of the deck but I have installed another bamboo blind hanging from the eaves, which covers this tiny chink in our armour.

2. Amenity – The deck is also a nice place to sit if the weather is a bit cooler. It is a great place to read a book, have a cup of coffee or just look out over our wonderfully productive

back yard. It is a wonderful space to let us get out of the house and relax, but still be protected from the sun and rain.



Especially for the cat!

3. Growing space – I installed a set of hooks outboard of the deck frame and another set inboard of the frame, the idea being that I would install hanging pots for food growing outside during cooler weather and then transfer them to the inside hooks during the peak summer heat and burning sun. In reality I haven't used the inboard ones yet. I also have a grape vine which I intend to grow up under the roof to provide a bit more cover, as well as grapes! A couple of blueberry bushes on the southern part of the deck rounds out the growing area.



4. Outdoor Cooking – the southern end of the deck is at a good height for cooking using our rocket stoves, and I regularly set up and use that area to make stir fries and noodle dishes in one of my woks, which work very well with our rocket stoves. I also have a square cast iron pan that I use for cooking barbecues with the rocket stove. I have also used this area to boil water and pasteurise the substrate when preparing for mushroom growing. Not exactly cooking, but still using the rocket stoves in that area.



5. Workshop space – as mentioned above, the southern part of the deck is at a great height for working, so it acts as an overflow for some of the work of cutting, drilling etc. that I would classically carry out in the garage. The space is airy, light and well ventilated and is generally a pleasant place to work, plus it is a flat area I can set out a project on.



6. Water Catchment – While it is not water catchment in the classic sense ie rain going from roof, to gutter, to tank, I have constructed a permeable path outside the perimeter of the deck and any rain is conducted from the roof down into the path and from there into the ground. Previously in times of heavy rain, runoff from this area would find its way through to the neighbours, but with the current system all rain which falls on the deck area winds up in our soil, keeping plants alive in drier times.

No water lost, even in a storm



7. Storage – I do use a small part of the area for storage, I built a small table over the outdoor part of the aircon and we use it to sit our drinks etc on, but I also use it to store some of our home grown onions out

there. The area is dry, has good ventilation and is easily accessible from the kitchen so I can whip out and grab an onion or two without cluttering up the kitchen.

8. Drying washing – It is an undercover area which we use to dry washing in times of inclement weather. The inboard row of hooks I was going to use for the hanging baskets was been strung with washing line and pressed into service to dry washing. We also have a couple of portable aluminium fold up washing lines which we can also set up on the deck as needed to provide more drying space.



9. Show Case – I use it to display things like our rocket stoves, stored heat cookers, solar food driers, pot in pot coolers and whatever else I can think of when we have open days like Permaculture Day and sustainable House Day. They are at the perfect height to be inspected by visitors walking in through the garage as part of our yard tours.



10. All weather access to the garage – I can whip out onto the back deck and walk along it in pouring rain and then drop down the stairs on the southern end and into the garage more-or-less without getting a drop of rain on me. This can be very handy if the off-grid system requires an adjustment during a storm or whatever. I have installed a 12vDC light under the eaves in the middle of the deck which provides an admirable degree of lighting if required.

While I must admit that Linda deserves the credit for motivating me to build the new deck after putting up with the remnants of old one for many years (you gotta sneak up on these things) I am very happy with how it turned out and with what a useful space it has become.

8.0 The Genkan



A Genkan is part of a Japanese house, it is the entryway, and traditionally the place where the outside shoes are removed and the inside shoes are put on. Being the voyeurs that we are, we watch some youtubers especially [Tokidoki Traveller](#), an Australian girl living in Japan, and it appears that everyone there, has a genkan, even in an apartment. While I considered this an interesting fact I didn't really see the bigger picture on the how and why of the genkan until I read David Holmgrens' book *RetroSuburbia* where on page 185 he talks about the 'No Shoes House'.

The idea is that cleaning (particularly of carpets) can be reduced if there is a system in place to prevent the dirt outside being tracked inside, especially when you are outside working and growing your own food etc. I have also read where this system also shows respect for the people (person?) who cleans the house by preventing the entry of grunge, which will then require extra cleaning. Thus time, energy (human and electrical) and resources are saved.

Unfortunately this is Australia not Japan and such concepts can sometimes be at odds with what we are used to. My eldest daughter tried to implement a 'no shoes' approach for their place, but found that she got considerable pushback from visitors. I remember as a kid being required to take my shoes off before going into friends' houses, but clearly the world has changed. Thankfully (or not) we rarely get visitors so this has not been an issue for us!

It also appears that, at the front door at any rate, we have an area that is deal for use as a genkan. A few years ago I pulled up the carpet in front of the front door and put down some

ceramic tiles. The area is just right for removing shoes and leaving them on the tiled part, which is easily cleaned. We also have a covered area outside the back door, when I put the back deck up I extended the cover so the concrete top step is now under cover too. We were kind of 'pre-adapted' to make use of this idea!

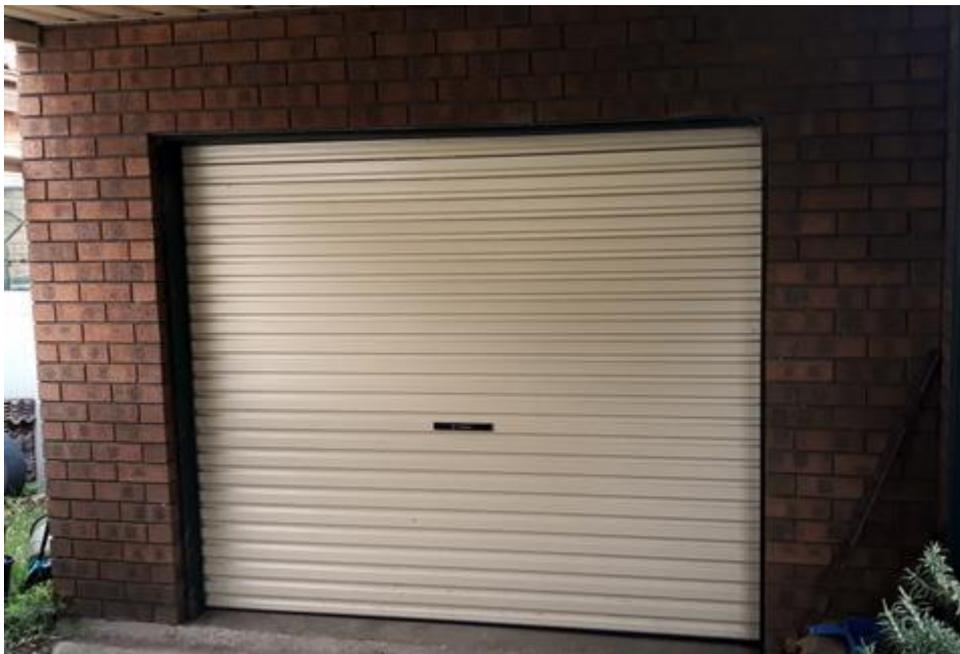
We now have places to take off the dirty shoes and generally have 'inside' shoes for cooler weather (I have a pair of 'Slumbies') and Linda has slippers that she uses outside the house. One issue that has cropped up is when we are moving from the backyard to front yard through the house, and to prevent the need for fancy footwork we have installed a runner that goes from the front tiles, across the area of carpet to the kitchen lino, and from there we have ceramic tiles in the laundry. We can make it from the front door to the back door without touching the carpet.

So far it is working for us!

9.0 The Garage

The garage was our first major addition to the house (after the open fireplace) and I needed it to be able to do STUFF.

Our garage is a multipurpose building that is much more than just a place to keep the car, in fact a car has not seen the inside of it since the early days. It is a simple rectangular building roughly 8 metres by three metres, with the front (eastern end) enclosed in brick the same pattern as the house and bearing the roller door, the south and west walls are constructed of a hardwood frame and enclosed with Hardieplank, (and yes, Hardieplank of this vintage contains asbestos, so no cutting or drilling). The north wall is common with the south wall of the house. The roof is rib and pan galvanised sheeting over hardwood joists, sloping down towards the back of the building.



There is no direct access from the house into the garage, but there is a door in the northern wall of the garage which extends past the back of the house, allowing me to get into the garage from the

end of the back deck.

The garage has acted as, and enabled me to do a whole stack of things –

Workshop – It has been my workshop first and foremost, it gives me a place out of the weather to do work. This may be conducting repairs or building new stuff from scratch. Building things like ollas or deep pipe waters for irrigation, the solar oven or solar food dehydrator to make direct use of the sun's rays, or to make any number of gardening bits and pieces.

WE have a number of work benches set up with different types of vises that make working by myself easier, that way I don't need to hassle Linda (or anyone else) to hold stuff for me. One of the things my old mate Bill Tarplee taught be was that to be able to do stuff by myself I needed to have vises so I could secure the material being worked on safely. Among other things, we have 2 woodworking vises, 2 engineers vises, a blacksmiths leg vise, a pipe vise, a compound vise and a drill press vise.

We have five benches, two 1800mm x 600mm, two 900mm x 600mm, plus the original 'folding' one, 1000mm x 550mm, secured to the wall at the back of the garage under the one and only window. Of course some of this area is used to support fixed power tools so not all of the area is available for construction work.

Tool storage - . It has allowed me to store and use my considerable collection of hand tools as well as a place to use them. It is also a place to set up and use larger power tools such as the wood lathe, bench drill, table saw, router, small band saw, drop saw, grinder and electric welder. I also had a (large) homemade press and a pipe bender but I needed room and realised I hadn't used either for over 30 years so I donated them to a high school my mate John was teaching at.



Spares/Consumable Storage – This was probably more important when I used to do my own car servicing and we had a pretty comprehensive set of spares for many of the cars we owned. We still have bike spares and spare blades etc for our tools. It can also be irritating to have to whip out at a critical juncture of a build to pick up a screw, nut, bolt or whatever so we have a good collection of consumables to support what we are doing. I am not saying I have never had to whip out to pick something up from the hardware, but many is the time I've been able to find exactly what I needed in my stock of spare nuts, screws and bolts etc.

Bike garage – We have a trike, owned by Linda, which we do use for local transport around St Clair and it not only needs a place to reside, but a place for us to maintain it. The garage suits both of these purposes.

Runoff to tanks – When the garage was originally built the council inspector who checked it agreed I could put some water tanks on the back (western end) rather than wrecking my existing veggie patch by installing a rubble drain. This allowed me to put two galvanised 500 gallon (2250 litre) water tanks on the back of the garage and for 20 years that was the only water storage we had. They are still in regular use too.

The gutter of the southern face of the house runs over the garage roof for most of its length, because the garage abuts the house on that side, so some years after the garage went in I

installed an offtake and valve from the guttering over the garage. This allowed me to take water from the house roof which up until that time, had just gone straight into the stormwater system, and direct it into the tanks.

This modification effectively increased the catchment area of the garage roof by about double, ensuring that empty tanks refilled more quickly when we got rain.

Alternative energy set up – The garage facilitated our 12 volt alternative energy set up in a number of ways. Firstly, right from the start, because the long axis of the garage is east-west, it provides an excellent place to mount solar panels. The first solar panel I ever bought over 35 years ago was mounted on the garage because it faced the right direction, was flat and easy to walk (and work) on and the steel roof made it easy to secure the panel mountings to. In fact it remained the only place photovoltaic solar panels were mounted until we got the back-to-the-grid system installed on the back of the house roof about 10 years ago.

A good proportion of our solar array is still on the garage roof, but we also have panels on the east and western faces of the house too, but the garage roof has been the mainstay of



our solar production for over 35 years, and will continue to be into the future.

But there's more! When I became interested in setting up the alternative energy system I needed a place with plenty of ventilation (off-gassing batteries!) and outside the main house to set up the batteries and

switchboard etc. With the northern wall of the garage being common with the house it made it an ideal place to set everything up. I could then run the circuits up into the roof of the house through a hole in the brick wall so all the wiring was out of the weather. This also reduced the length of the wiring runs to get the power to where I needed it, thus reducing line losses.



Consequently, when it came time to replace the 12 volt system with the 24/240 volt system, the garage was the ideal place to set things up.

Another thing the garage allowed me to do is to set up a couple of wind generators to contribute power the 12vdc system. Wind generators can be noisy and if installed directly on the house they would transmit vibrations back to the house during times of heavy wind. By mounting them on the garage that prevented the vibrations being a problem. In general terms, I don't know how far I would have gotten on the alternative energy system with having the garage. For more details on the old 12 volt system click [here](#), and for more details on our new 24volt/240 volt solar system click [here](#).

Blacksmith forge – Many years ago I put together a blacksmiths forge which I was going to mount in the garage. I chickened out and set it up outside (not ideal) and then eventually moved it into one of the sheds, but no ventilation installed this was also less than ideal. After many years I got around to setting it up in the garage, and this I am very happy with.



Cover southern end of the house - The garage effectively shields the southern end of the house from the hot summer sun, because while I use the term 'southern' it is in fact facing slightly west of south, allowing the hot summer sun to hat it up at the end of the day. The garage shades it and keeps it cool reducing solar input to the lounge/dining area on hot summer days.

Trialling Miscellaneous Fun Stuff - like building in this [drink bottle light](#), which worked out to be surprisingly effective!



Garages are different things to different people, but having a garage to work and store stuff in has been immensely valuable in our efforts to live a more sustainable life.