



INTEGRATE RATHER
THAN SEGREGATE

AQUAPONICS: THE LOW-DOWN

Words by Django Van Tholen Photos by Ben Pohlner

Aquaponics combines aquaculture and hydroponics to produce fish and plants in one integrated system, creating a symbiotic and mostly self-sustaining relationship.

Combining fish and plants isn't a new concept, with its origins dating back several millennia. Asia's rice paddy farming systems is an example. Aquaponics today borrows and combines methods primarily developed by the hydroponics aquaculture industries, along with new ideas from the innovative DIY online community.

HOW IT WORKS

The basic principle of synergy involved in aquaponics is the requirement of clean water to promote the healthy and fast growth of fish, and the need and ability of plants to use nutrients from the water to grow. One of the most critical aspects in this relationship between plants and fish is the diverse microbial community which transforms fish wastes into forms of nutrients more easily used by plants for growth.

In the simplest arrangement, you will need a tank for fish and a trough for plants. Given that plants require physical support for their roots to extend into, some kind of growing substrate is required in the trough. Often quarried gravel, scoria or manufactured clay pebbles are used. More advanced growers tend to use a raft system. A raft usually floats on the water, allowing the plant roots to hang into the water.

The substrate is often the most important design feature as it is vital in supporting and promoting the microbial health of the system. Microbes coat the gravel, so as the water is recirculated between the fish tank and the planted trough, the fish wastes are filtered which produces clean water for the fish.

WHY AQUAPONICS?

Aquaponics systems use about 90 per cent less water than soil based food production, which is why aquaponics systems are often established in deserts and islands (where freshwater resources are precious). In many of these locations, fresh

fish, meat and vegetables are also at a premium due to high food miles, making local aquaponic produce a more sustainable option. Aquaponics can also provide access and food sovereignty to people in locations where soil fertility may be low or where risk of soil contamination exists.

The full life cycle analysis debate is well underway, the answers to which are situational and not easily arrived at given the complexity of the global food system.

Plant growth in aquaponics is very quick, with high productivity from a small area. This is the same for fish growth, with people easily growing 10 kgs of fish for each cubic metre of water in a simple backyard system.

For the backyard enthusiast or school environment, aquaponics as an educational tool can cover the most basic concepts of biology and ecological systems to the more complex interactions of water and microbial biochemistry. These systems can also be designed to mimic local aquatic ecosystems and make for fantastic observation. On a practical level you can explore construction, plumbing and the tricky balance of growing fish and vegetables simultaneously. It is very much a multi-skilled project!

MAINTENANCE

Like all gardening, there is always regular maintenance, and aquaponics is no exception. However there is a certain labour of love that goes along with aquaponic growing, especially for the beginner.

The day-to-day maintenance requires fish to be fed once or twice a day, keeping an eye on fish behavior and health to avert disease. The system's water level and pump need to be checked, making sure the aerator is running and supplying oxygen to the fish. Every few days it's time to check your water quality and adjust where needed; a crucial task. This involves a range of reasonably simple tests you can buy from an aquarium shop.

Once you get the hang of it, tasks will speed up, requiring less effort. Aquaponics for the most part requires far more attention to detail and time while you're learning.



USE + VALUE RENEWABLE
RESOURCES + SERVICES

BUILD YOUR OWN NATURAL SWIMMING POOL

Words and photos by Shona Macpherson

A natural swimming pool is a beautiful and healthy alternative to a conventional pool. By building a natural swimming pool, you are creating a self-cleaning water system that benefits both people and local wildlife, with no risk of releasing chemicals or pollution into the atmosphere, local waterways or environment.

Natural swimming pools use no chemicals or pesticides to maintain the water quality, a welcome relief for those who suffer skin allergies or sensitivities. Through the use of plants and a small aerator, the water ecology is regulated and filtered to keep it clean and healthy.

There are hundreds of ways to build a natural swimming pool and the techniques and systems you use will vary depending on your circumstances. Generally, a natural swimming pool is divided into the swimming zone and plant zones. Usually the centre is for swimming, and the shallows for plants and animals to filter the water.

The plant zone is usually an equal area to the swimming zone. Plant zones have varied depths so different water plant species and varieties can be used, including fully submerged varieties. The plants and animals condition the water, keeping it clean, while the circulation system gently moves the water around the pool to allow the plant beds to remove excess nutrients.

The circulation system is created during the construction to help the natural filtration process. The addition of an aerator also helps oxygenate the water. Plants and animals maintain the health of the water, oxygenating and filtering, as well as removing the nutrients that would otherwise allow algae to flourish.

BUILDING THE POOL

Natural swimming pools can be built cheaper and more ethically than conventional pools, depending of course on the design, site, size, earthworks, cost and availability of materials

you wish to use, and the extent of construction work you're willing to undertake yourself.

There is no set way to build a natural swimming pool. The basic principles can be adapted to many different designs and budgets. There are three main methods of construction to choose from: a rubber liner, concrete or clay base. The materials, plants and filtration system can be different depending on your desired outcome and budget. When considering the design and construction, there are so many options. Having a final plan and estimated budget (along with knowing the building process stages) makes it much easier to stick to the plan.

PLANTS

When deciding on water plant species, consider not only which varieties you like but which are best suited to your area and climate. It is important to remember that many water plants can spread, take over and enter natural waterways, so researching varieties that work for your situation is vital to a low-maintenance system. We chose mainly native water plant species with some exotics. These included assorted water lilies such as water iris, Japanese and Louisiana, several varieties of rush including variegated club, and dwarf papyrus, ribbon grass and water plantain.

MAINTENANCE

Like all pools, a natural swimming pool requires regular maintenance. You'll need to remove dead foliage, leaves and flower heads from the plant zone, and divide plants as needed. The leaf skimmer needs to be emptied regularly and the filter in your pump system will also need cleaning. There's more maintenance required in summer as there is more plant growth and warmer water temperatures. Cooler water means less algae and therefore it is important to have a deep zone in your pool for cooler water.



Sorang



USE + VALUE RENEWABLE
RESOURCES + SERVICES

FORAGING EDIBLE SEAWEED

Words by Dr Alecia Bellgrove and Robyn Rosenfeldt Illustrations by Kathleen McCann

Growing in our oceans and lining our beaches, seaweed is familiar to us all. But what many of us don't realise is the nutritional benefit that seaweed offers.

The edible seaweed industry in Australia is in its infancy. It's only recently that scientific research is being conducted into the nutritional benefits of seaweed and how we can start incorporating it into our diets.

Southern Australia has more species of seaweed than any other region, with 62% of species not growing anywhere else in the world. This means that we're starting from scratch when it comes to understanding the health benefits and nutritional values that it holds.

It also means that we have a huge potential for discovering more species of commercial value. On a global scale, Australia is perceived as having clean and pure waters, making Australian seaweed products highly desirable to the rest of the world.

NUTRITIONAL VALUES

Seaweed accumulates nutrients, trace elements and minerals from the water in which it lives. Some of these, such as zinc and iodine, are important additions to our diet and are often lacking in terrestrial grown food. By eating seaweed, we are increasing our vitamin and mineral consumption (see the Seaweed Solution article on Page 23). The more diverse types of seaweed we eat, the wider the range of nutritional benefits we experience.

ABSORBING TOXINS

Unlike mushrooms, seaweeds have few if any naturally occurring toxins. Any seaweed is potentially edible; it's just a matter of how they taste as to whether you want to eat them.

The problem is that the same processes that enable seaweed to concentrate beneficial dietary nutrients also enable them to accumulate metals, pesticides, herbicides and other contaminants of emerging concern (CECs) from the water they grow in, making the consumption of seaweed potentially toxic.

Dr Alecia Bellgrove and her team at Deakin University are currently testing Australian seaweeds grown in clean and unpolluted waters, along with those grown in highly urbanised (and potentially polluted) waters to see what levels of different pollutants, beneficial fatty acids and minerals occur. They

are yet to finalise the results, so when harvesting seaweed, it's important to think very carefully about where you're getting it from.

Your safest bet is to buy dried seaweed from reputable companies that harvest it sustainably and test it for toxins. However, if you're mindful, collecting your own can be a rewarding experience that allows you to become more in touch with the ocean and where your food comes from.

WHERE TO COLLECT

Before going out foraging for seaweed, you need to be aware of the laws that surround its collection in your area. Go to your local Department of Fisheries website to find out your state's regulations. Some states allow only beach cast seaweed to be collected, whereas others allow a small amount above the low tide mark — but never in marine parks.

Also until we have data to suggest otherwise, it's best to avoid collecting seaweed from highly urbanised areas or close to river mouths, sewage outlet drains and other wastewater outlets.

ENVIRONMENTAL IMPACTS OF HARVESTING

It's not just danger to our own health we need to think about when foraging seaweed, but also the effect it can have on aquatic life. Seaweeds are often foundation species in many coastal marine ecosystems; the engineers that the rest of the ecosystem rely on. They provide food and habitat for many other species living within it, and often alter the physical environment, such as by reducing light, wave action and desiccation at low tide. The canopy of some varieties provides protection for a whole range of species of animals. With Neptune's necklace (*Hormosira banksii*), if canopy is reduced by just 25% it can dramatically impact the animals that reside within.

If just one branch (frond) is taken from each plant and that is spread across the shoreline, that's a more sustainable way to forage. It is important to know and understand the varieties that you are harvesting, as some types of seaweed will happily grow back if cut whereas others will not, killing off the plant and harming the ecosystem.

The following is a guide to a few of the more commonly available seaweeds and how to harvest them with minimal impact:



Arhiti Chamsat

PERMACULTURE
ANIMAL
SILVER PERCH
(BIDYANUS BIDYANUS)

Words by Beck Lowe

Silver perch are useful, hardy native fish suitable for farm dams, aquaponics and other aquaculture systems. They are easy to feed and as they're native to a wide swath of the Murray-Darling river system, they're adaptable to a range of conditions.

DESCRIPTION

As the name suggests, silver perch have a silvery grey appearance. They are darker on top and lighter on the belly with spiky dorsal fins along the back. They can grow up to 50 cm and 6 kg, but are unlikely to reach these sizes in farm dams.

FUNCTIONS IN A PERMACULTURE SYSTEM

Silver perch are good eating fish. They have a very high level of omega-3s, making them a particularly useful addition to a permaculture diet. They are generally eaten when under a kilogram.

They may be useful in keeping some problem species, such as mosquitos and filamentous algae, at bay.

They can be stocked with other species such as yellow perch to create a more diverse polyculture. Australian aquaculture authority Nick Romanowski suggests that silver perch, catfish and yabbies are an ideal combination for farm dams.

STOCKING, BREEDING AND GROWTH

Young silver perch fingerlings (young fish around 5 cm long) are available from native fish farms for stocking farm dams or other systems. About 200 fingerlings per megalitre of water in a dam is recommended.

In aquaculture systems where the water is aerated, additional feed given and wastes removed, stocking rates can be very high. The actual numbers will depend on how well your system functions, rather than the volume of water. If you're just learning to use a system, it's best to start with a low stocking rate.

In warmer parts of the country and optimally controlled aquaculture systems, silver perch may reach eating size in 18 months, but in open farm dams in the cooler regions of Australia it's likely to take two or three years.

It is possible but not common for silver perch to breed in farm dams. In more controlled aquaculture systems, breeding can be facilitated by varying the water temperature and movement in tanks, but in dams you will probably have to restock with fingerlings every few years.

FEEDING

Silver perch eat both plant and animal matter, making them easy to feed. In a farm dam with a good ecology they shouldn't need supplementary feeding, as they'll forage on aquatic insects, shrimp, algae and other plants. Feeding them an occasional treat of bread encourages them to come to the surface for food, making them easier to observe (and to catch later on).

In a more intensive aquaculture system, it's common to feed silver perch formulated pellets, however these are unlikely to come from a sustainable source. Alternative feeds such as algae, duckweed, and invertebrates (e.g. black soldier fly, worms) are relatively easy to produce. Some green waste scraps can also be incorporated into their diet.

HABITAT

The larger the dam the better, but at a minimum the dam should be around 15 metres in diameter. In areas smaller than this, aeration will be required to maintain adequate oxygen levels.

If your dam has recently been completed, it's worth waiting a year or so for small invertebrates to colonise before you add fingerlings. In the meantime you can establish plants at the edges and shallows to provide habitat for a range of small species.

Large branching tree limbs submerged in your dam will provide habitat for the fingerlings and help hide them from predatory birds. Add 'furniture' to your tanks, such as small branches or old ceramic sewer pipes.

Silver perch do best in water temperatures around 20–30°C but they can cope with a much wider temperature range, although they will stop growing in cooler months. At higher temperatures they become vulnerable to the low oxygen levels of warmer water.

CATCHING AND EATING

In smaller systems nets will generally be used. They can be fished with a rod from farm dams using a small hook and bait.

If the fish have been grown in a typical farm dam they may need purging before they're killed and consumed, otherwise they may taste muddy. This can be done by keeping them in a large container of clear, fresh water for a couple of days, and changing some of the water daily. Older fish are often skinned before cooking.

Silver perch can be prepared in any of the standard ways to cook fish.



Beck Lowe

Above to below: Silver perch in tank; Silver perch caught from a dam.



USE AND VALUE
DIVERSITY

CROP ROTATION

Words and photos by Emma Bowen from Pocket City Farms Illustration by Grace West

Crop rotation can bring great benefits to your yields, plant health and soil health, whether you're a market gardener, homesteader or backyard grower. Crop rotation is the principle of avoiding repeating a crop with either the same crop or one in the same botanical family in successional plantings. For example, broccoli, cauliflower, cabbage and kale are all in the Brassica family, so you'd avoid planting one of these straight after another. It also involves rotating crops according to their nutrient needs, whether they are a fruit, leaf, legume or root crop.

WHY SHOULD WE ROTATE CROPS?

The practice of rotating crops ensures variety; a cornerstone for a diverse biological system. By varying the crops going into the same place each year, you'll help avoid pest and disease problems. This is because it disrupts the life cycle of many organisms, especially soil-borne diseases, which might otherwise be able to thrive on a continuous planting of the same crop. Some of these plant diseases can be difficult to get rid of once present, however crop rotation and avoiding the reintroduction of the affected crop for at least four years after is a good way to break the cycle.

Crop rotation also helps the garden to continue producing without detrimental effects and depletion of the soil. By looking at the different nutrient needs of plants, we can rotate in a way that provides all plants with what they need without having to constantly add compost or fertilisers. Planting crops of diverse root depths will penetrate the soil and improve its structure, as will adding organic matter. Rotating crops also helps to encourage habitat and biodiversity.

CROP ROTATION FRAMEWORK

Just as the benefits of crop rotation are many and diverse, so too are the considerations and the ways in which it can

be done. Rotation plans can be as short and simple as a two-cycle rotation (e.g. legumes and non-legumes), or as long as eight or ten-year cycles.

A common framework for crop rotation is a four-bed (or four-year) rotation focused on plant type. These are usually in the following categories and order:

- Legumes, e.g. beans, peas, green manures. These are good at building nitrogen in the soil and providing organic matter.
- Fruit, e.g. tomatoes, capsicum, cucumber. As heavy feeders, fruiting plants benefit from the nitrogen left behind by the legumes, building strong leafy plants early in the season.
- Leaf, e.g., spinach, cabbage, lettuce. These still do best with plenty of nitrogen in the soil and benefit from the legume nitrogen, although levels are likely to be lower.
- Root, e.g. beetroot, carrot, potato. With low nutrient demands, these are great to follow on after the others.

The cycle then starts again with another legume crop. The simplest way of incorporating this system at home is to use four beds or growing spaces. In year one you'll have your legumes in bed one, fruit in bed two, leaf in bed three and roots in bed four. Then for each successional planting you'll want to ensure it cycles in the rotation, so that your fruit then moves into bed one following the legumes from year one, the leaf into bed two to follow the fruit, the roots in bed three to follow the leaf, and you'll plant legumes into bed four to follow on from roots.

Also consider the botanical families in rotations. These groups for example would include:

- Leguminosae/fabaceae, e.g. peas and beans
- Asteraceae, e.g. lettuce, Jerusalem artichoke, endive
- Brassicaceae, e.g. cabbage, kale, broccoli, turnip, kohlrabi, radish, rocket

N
FLEMINGTON FOOD FOREST
 farnham street
 neighbourhood
 learning centre

playground
 dry zone

wild rocket
 berry saltbush
 inland pigface
 yamou
 oregano
 garlic chives
 thyme
 chives
 catmint
 basil mint
 lemon balm
 ruby saltbush
 lavender bergia
 jerusalem artichoke
 calendula
 feverfew
 tansy
 dandelion



neighbourhood house

moist zone

mint
 spearmint
 river mint
 perpetual spinach
 nasturtium
 warrigal grass
 alpine strawberry
 garden sorrel
 red veined sorrel
 raspberry
 sultanberry
 pepino
 parsley
 red mustard
 radishes
 sweet potato

community garden

climbers on fences

only the tough survive

Joanne Nataprawira



DESIGN FROM
 PATTERNS TO DETAILS

FLEMINGTON FOOD FOREST: AN ORCHARD CONVERSION

Words by Ben Buggy

Food forests are a quintessential permaculture approach to food production. By layering plants that work together, a garden can offer a harvest with fewer inputs by mimicking an established forest ecosystem. The extra foliage and root matter in the system provides shade, water retention and organic matter.

The Flemington Food Forest in Melbourne's northwest, sits on the grounds of the Farnham Street Neighbourhood Learning Centre (FSNLC). The garden is brimming with life, sandwiched between a children's playground and the community vegetable garden.

Joanne Nataprawira has been involved in the project since its outset, providing design input, planning and direction. Jo began working with Pat and Tom of the Melbourne Inner Northwest Transition Initiative, Pip Mackey from FSNLC, and other local residents. Further support for the program has come from Brigidine Sisters Justice and the Moonee Valley City Council.

GRASS SUPPRESSION

Jo and her team started with small established trees in a conventional orchard system, with an understory of grasses and broad-leaved plants. Where the understory includes running grasses like kikuyu and couch grass, it's important to fully suppress them. 'In other projects, we'd tried to dig the grass out, but the soil is quite heavy clay and it's really difficult to dig,' Jo says. They instead used recycled materials (cardboard sheets and boxes, newspaper, hessian bags and woodchips) to cover the grass and deprive it of sun and water.

PATH MAKING

Mapping out the paths at the beginning is an important part

of the design process. Paths should allow access to the trees, entry and exit points, and generally give good access to the garden space.

'We wanted to have the woodchip paths quite deep so that the water wouldn't just run off,' explains Jo. Digging the paths out to a depth of 20-30 cm also provides extra soil that can be used for planting later on. 'Once we had dug out most of the grass, we sheet mulched down the edges a little way and then filled the paths with woodchips.'

ADDING SOIL AND NUTRIENTS

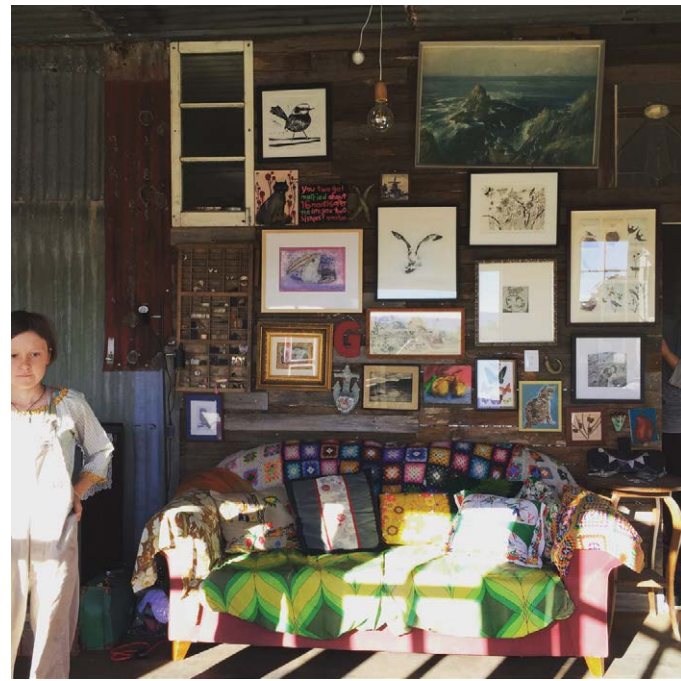
The topsoil was very thin in parts, so a garden soil mix was bought from a local garden supplier.

Nutrients can also be a great addition at this stage of the development. Rock dust is a slow-release fertiliser that sheds a range of macro and micronutrients over about 10 years. The nutrients offered will differ based on the source rock; matching the rock to your soil type will give the best results.

Helping to balance the soil pH at this stage will also have positive effects, especially if your soil is skewed to one extreme. This requires balancing the magnesium and calcium levels, using products such as lime or gypsum. Soil types are regionally and locally specific, so asking around your neighbourhood or garden centre will be a good start.

'We used a nice soil mix that included mushroom compost, but haven't added much else,' Jo says. 'We've planted nutrient accumulators that die off, such as comfrey, and do a lot of chop and drop.' This mimics the natural forest process that brings nutrients up from the subsoil and bedrock, making them available on the surface. The mulches used (straw and woodchips) are also feeding the soil.

As the potential for harvest grows over time, small additions of nutrients using manures or foliar sprays will ensure the plants offer the best bounty.



USE SMALL &
SLOW SOLUTIONS

OUR STRAWBALE BUILD: SMALL AND SLOW SOLUTIONS

Words and photos by Annie Werner

With the help of family, friends and our wider community, my partner and I built a passive solar strawbale home. Building a home is an incredibly rewarding, exhausting and empowering thing to do. It's an opportunity to implement ethical principles, learn and practise skills, build community, and create a space to live in that is truly reflective of your personal aesthetics and philosophy.

Our house building journey germinated many years ago when as a 15-year-old, I visited the home of a woman who had built by hand her own tiny mudbrick home. From that moment on I was somewhat obsessed with the idea of building my own home. It was very early on in our relationship when I declared my intentions to my partner, Genevieve. Luckily she came onboard, and in the last six years we have hand-built a strawbale tiny house (which we lived in for five years) on our property in the Bega Valley, while we prepared for and built our larger family home that we moved into in March this year.

Of primary concern to us when we set out on our home building project was that our house wouldn't cost the earth, either metaphorically or literally. We wanted to create a home that would allow us to be mostly debt-free (building within our means), which would fit in with our ethics (being careful in design and utilising reclaimed material wherever possible), and appropriate to our lifestyle (with communal and outdoor spaces, responsive to the natural environment).

Something that reflected all of the concerns listed above was the size of the house. For financial, environmental and ethical reasons, we wanted the house to be small.

PERMACULTURE PRINCIPLES IN ACTION

Observe and interact

Our five years living in the tiny house (26 m2 plus a sleeping loft) really taught us about living in small spaces and utilising outside living areas. It helped us to understand the things we

really valued. This was our 'observe and interact' time, and it helped us to decide on what we really wanted from our big house.

Small and slow solutions

What we ended up building is a 93 m2 north facing rectangle, which emphasises communal spaces by having tiny bedrooms. The kitchen, dining room and a super-insulated cold-store take up more than half of the house, reflecting our passion for food. Obviously by global standards, this is still a huge amount of house for only four people, but with new houses built in Australia averaging 241 m2 for an average of 2.6 people, ours is definitely on the small side.

Keeping the house relatively small also meant that we built within our means and were able to do a lot of the work ourselves, which also kept the cost down. We also took our time building and designing the house, which meant we were able to alter the design as we learned about our land and the ways in which we wanted to work with it.

Taking time also allowed us to accumulate materials. A lot of what we used to build the house was reclaimed or repurposed. By slowly accumulating materials and designing and building around those materials, costs were reduced. All of the doors and windows in the house were salvaged from the tip.

One of our favourite features are the arched timber windows in our dining room, rescued from a skip bin by my mum more than 30 years ago. They came out of the old Wollongong courthouse when it was demolished. The glazier who replaced the glass for us was so thrilled to see such beautiful windows being restored and given a new life, and they have a wonderful story behind them, adding to the character of the home.

Produce no waste

In addition to reducing costs, by building slowly and sourcing second-hand, reclaimed or recycled materials wherever pos-

IN THE GARDEN: NOVEMBER - FEBRUARY

Seasonal garden guides for all climates.



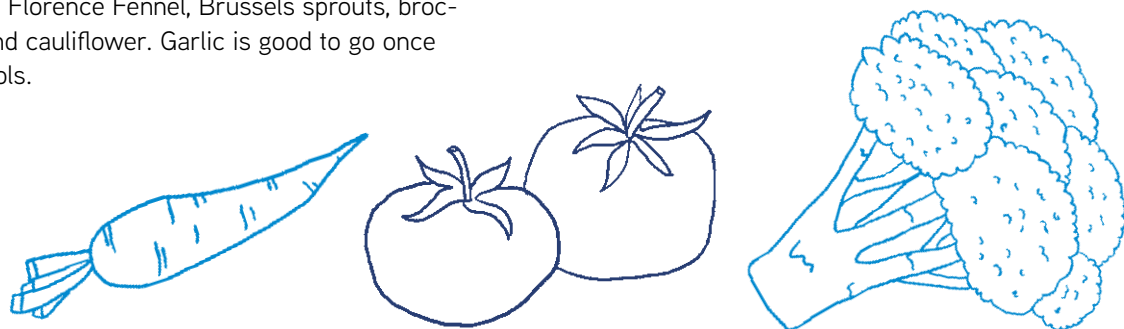
COOL TEMPERATE

What to sow:

- **November:** Basil, beans, beetroot, cabbage, capsicum, carrot, cauliflower, chives, coriander, cucumber, lemon-grass, marjoram, mint, oregano, parsley, rosemary, tarragon and thyme, English spinach, kohlrabi, leek, lettuce, onion, parsnip, pumpkin, radish, silverbeet, swede, sweet corn, tomato, turnip, zucchini,
- **December:** Lettuce, rocket, Asian greens, carrots, beetroot, celery, silverbeet, more leeks and tomatoes, salad onions, sweet corn, zucchini, cucumber, pumpkin, parsnips, celery, celeriac, Brussels sprouts, broccoli, cabbage, cauliflower, and potatoes (such as Kennebecs).
- **January:** Carrots, beetroot, radish, turnip, lettuce, Asian greens (e.g. rocket, mizuna, mibuna, mustard, cress), silverbeet, spring onions, bush beans. If you live in a warm spot, try seedlings of late zucchini, cucumber, small pumpkins like Golden Nuggets, sweet corn and even more tomatoes.
- **February:** Plant winter vegies including leeks, parsnips, celery, celeriac, Florence Fennel, Brussels sprouts, broccoli, cabbage and cauliflower. Garlic is good to go once the weather cools.

What to do:

- Put up trellises or teepees for climbing plants, so as not to disturb the roots of the plants once they are in full growth. Pinch the lateral shoots out of climbing tomato plants as they grow to encourage fruiting. Thin out crowded clusters of apples and pears for larger fruit.
- In January and February it's important to start planting your winter vegies so they have time to get the growth needed before the cooler months slow them down. It's time to keep up sequential plantings of summer vegies.
- Raspberries, strawberries, currants and brambles such as loganberries are all ripe for the picking.
- As the weather warms, give your fruit trees a deep watering and mulch. Add summer weeds to the compost and layer with animal manure. Check for scale on your lemons and olives.
- In February, collect and compost any fallen fruit or let your chickens or ducks do the work. Fruit fly prone fruit needs to be carefully disposed of.



WARM TEMPERATE

What to sow:

- **November & December:** Beans (dwarf and climbing), beetroot, broccoli, cabbage, capsicum, carrot, cauliflower, celery, chicory, chilli, Chinese cabbage, cucumber, eggplant, endive, kohlrabi, leek, lettuce, okra, parsnip, potato (tubers), radish, rhubarb (crowns), shallots, silverbeet, spring onion, tomatillos, sweet corn, sweet potato and zucchini. And the herbs: basil, chives, coriander, fennel, Gotu Kola, heliotrope, lovage, mint, parsley and tarragon.
- **January:** At the end of the month plant eggplant, zucchini, cucumber, capsicum, chillies, cherry tomatoes, lemon-grass, watermelon, rockmelon and pineapple.
- **February:** Again at the end of the month, plant silverbeet, leeks, spring onions, Brussels sprouts, bush beans, broccoli, avocado, cauliflower and celery. Basil is happy to go in now so try some purple, Thai, lemon and sweet varieties. Nasturtium, verbena, petunias and marigolds are great at attracting pollinators and beneficial insects to your patch.

What to do:

- Keep planting if seedlings have been hardened off. Harvest early tomatoes, berries, young zucchini and squash. Start collecting some seed from your lettuce and rocket or let them self-seed.
- On non-gardening days construct a couple of shade cloth tents to pop over the sun sensitive vegies like eggplant and capsicum to protect them from intense heat.
- Your plants will be hungry for a liquid feed so seaweed tea or liquid fertiliser is perfect. Apply to the soil early in the morning.
- In February, plant a green manure crop to add some life and love to an overworked patch. Try millet, lablab or cowpea. This will improve your soil incredibly. Water smarter at this time of year; first thing in the morning with a deep drink a couple of times a week. Mulch after watering the patch to a depth of about 7 cm, keeping clear of plant stems (especially young seedlings).
- And need we mention...keep harvesting the bounty!

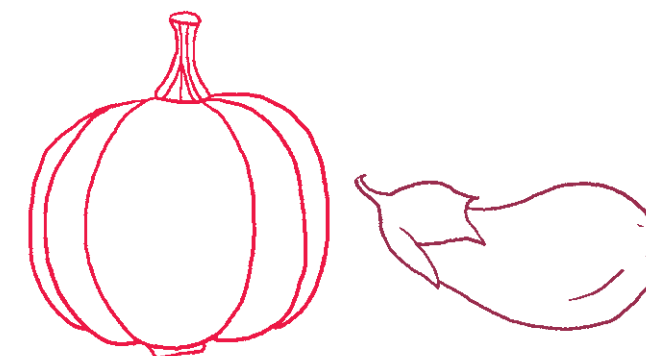
MEDITERRANEAN

What to sow:

- **November:** Seeds of pumpkins, zucchini, cucumbers, beans and melons. Beans, tomato, capsicum, chilli and eggplant. Bush beans need succession planting. Climbing beans like being sown direct and continued over a long period. Citrus trees, passionfruit vines and other subtropicals such as avocados and mangoes can be planted.
- **December:** Fast-growing vegetables like climbing beans, melons, pumpkins and zucchini, as well as repeat plantings of tomato and corn. Basil seedlings are ready to go out around the tomatoes and eggplant, and capsicum and chilli seedlings can be planted out. Coriander and baby spinach need frequent small plantings and longer shade periods.
- **January:** Corn, beans, squash, cucumber, gourds, pumpkins, zucchini and melons from seed. Summer seedlings of chilli, capsicum and eggplant would be best planted now, taking care to choose a location that will receive sun well into autumn. Sweet potato slips (rooted cuttings) grow quickly in the heat but also need a long growing season.
- **February:** Asian greens, beetroot, beans, carrots, fennel, horseradish, kohlrabi, leeks, lettuce, potato, radish, rocket, squash, swede, silverbeet, tomato, turnip and zucchini.

What to do:

- Strawberries, mulberries and loquats are ready for picking from November. Stone fruits, persimmons, pomegranates, apples and pears start to set so will need the fruit thinned or the branches supported to take the increased weight.
- Cut back woody capsicum and eggplants to encourage new growth.
- The next round of lettuces will benefit from partial shade to help prevent sunburn and bolting to seed.
- Harvesting, harvesting and yes, more harvesting. Check daily for tomatoes, zucchini, beans and berries.
- Keep newly planted seeds semi-shaded and constantly moist. All vines can be trained to the desired shape to encourage the main branches into their permanent shape, allowing lush growth to bush out later.
- Summer prune fruit trees in February after harvest, and give a deep soaking and mulch with lucerne. Feed citrus and roses.



DARREN J. DOHERTY

Words by Samantha Allemann Photo by Isaabella Doherty

Darren J. Doherty grew up on the family farm near Bendigo, learning rural and farming skills from his grandfather. 'He saw that they would hold me in good stead,' says Darren. 'As someone who had lived through the Depression, he could see that those times may come again, so if economic circumstances collapsed I'd have the ability to survive.'

While it was a scary message for a kid, Darren says it was also a great one, because it was backed up by experiential skills he still carries today. When Darren became interested in permaculture, the set of agricultural and design principles already sounded familiar to his grandfather. "When I showed him Bill Mollison's *Permaculture – A Designer's Manual*, he said 'we've been doing all of that stuff for forever'," says Darren.

A farmer, developer, trainer and author, Darren coined the term 'regrarian', a combination of the words 'regenerative' and 'agrarian'. He developed the Regrarians Platform, a framework to help people design and plan agricultural projects, and works with his wife Lisa Heenan and their daughter Isaabella Doherty as directors of the Regrarians.

'Regrarianism came out after we did the world's first carbon farming courses and world tour in 2007,' recalls Darren. 'We started to look at all of these different methodologies and built them into the framework that became The Regrarians Platform. It's based on the Keyline Scale of Permanence which P. A. Yeomans developed in 1958. I did some work for holistic management educators and they determined that the Keyline Scale of Permanence would be a really good framework to build our training around. I looked at it and thought "how can I make it more holistic?" I brought in additional layers, such as the economy, energy and social issues.'

Darren also looked at what he perceived to be the strengths and weaknesses of permaculture and holistic management. 'Permaculture is really good at land planning, but it lacks process,' he says. 'Holistic management is great on decision making and analysing people, but it didn't have a land planning process. I looked at all of these different methodologies and saw that they didn't have a workflow. That was a big moment for us to determine that we could use all of these different methodologies and bring them in together so that the weak links were addressed.'

'There's not many people who come out with something

absolutely original,' says Darren. 'I'm one of those people who has built on the shoulders of other people's work.'

The Regrarians Platform is made up of 10 levels: Climate, Geography, Water, Access, Forestry, Buildings, Fences, Soil, Economy and Energy. The platform covers these areas according to specific contexts, with a day dedicated to each of them taught at Darren's REX conventions. These conventions have gone global, with an audience evenly split between professional farmers and back-to-the-land types.

'People have really resonated with it,' says Darren. 'We've done 200 trainings around the world now and hundreds of planning jobs using the platform.' While the Regrarians Platform is effectively scale neutral, Darren says his work is geared towards agricultural landscapes. 'We're not trying to be all things to all people,' he says. 'We're pitching to a particular segment of society who are involved with larger-scale land management.'

This is a reflection of Darren and his family's own context. 'We're not urban people,' he says. 'Whilst we'll come in and have a coffee in town, we much prefer working out on farms.'

'Bill Mollison said years ago that the purpose of the city is to keep people out of the country,' says Darren. 'Bill was brilliant in his understanding of environmental psychology; that the purpose of agriculture over time has been to reduce the number of people who are producers and increase the number of consumers. That's been a very successful strategy, particularly here in Australia.'

'There's been a radical deskilling and a disabling, and permaculture has done a great job in helping people arrest that. Having more self-resilience in a community context is really important.'

Darren, Lisa and Isaabella shared their passion for regenerative farming with a wider community, making the award-winning *Polyfaces* documentary. The film, which took four years to create, focuses on the innovative Virginian farm run by Joel Salatin and his family. They were inspired to share Joel's story to create change in agricultural and local food systems.

Despite the current status of the world, Darren says he still has a lot of hope. 'I'd go sit in my room and find something else to do if I didn't,' he says. 'We do see the hope and we have a responsibility to others in our lives, to help them do better.'

