Building Resilience
The Secrets of Home Food Production

Permaculture Noosa
Nov 2017

By Graeme Sait
The Chemical Experiment

For the past ten decades, we have employed a chemical, extractive model for our food production.

We began this experiment by dumbing down crop nutrition to just 3 minerals, while removing a little of all 74 minerals, with each season.

Soon after adopting this simplistic nutrition, we experienced unparalleled pest pressure and science stepped up to the plate.

The toxic rescue chemicals became our saviour, but we have increased their use every year thereafter.
Building Resilience

The Wake Up Call

A global awakening is underway. We are finally recognising the unsustainability of this symptom-treating approach and many are seeking change.

The drivers of this revolution include the following:

1. At our current rate of top soil loss, there is just **60 years** until zero remains.

2. We’ve lost **2/3** of our humus and that carbon is now the lion share of the CO2 blanket trapping more heat and changing our climate.

3. Several studies of children have revealed a myriad of **health problems** relative to the accumulation of chemical residues and the unresearched ‘**cocktail effect**’.
4. Our food has become a **shadow** of its former self, with less flavour, shelf life, and medicinal qualities.

5. **Degenerative illness** associated with compromised nutrition has become our largest killer.

6. There is a global movement towards ‘**putting a face to your food**’ which is the basis of the global farmers market phenomenon, and a direct-to-consumer, supermarket model in Japan.

7. There is a growing awareness that **we are what we eat** and what we eat comes from a compromised soil.
Getting Back To Root Causes

• Poor quality crops and increasing pest pressure are never an *accident* or a question of bad luck

• A fungal disease is not a *deficiency of a fungicide*

• Medicine, veterinary science and agricultural science have all become based upon the *treatment of symptoms*.

• The problem is not solved. The chemical serve as a temporary *bandaid*.

• Nutrition gardening is all about getting back to the *root cause* and solving the problem.
Minimising the Hangover

• The 60 year post-war boom was fuelled by **ancient sunlight**. These products of photosynthesis, oil and coal have energised our economies but not without a price.

• Since **1950**, we have contributed massive amounts of greenhouse gasses to the **blanket** that determines our climate.

• This has created an unparalleled **climate crisis**.

• How do we perform an urgent **rescue** on a planet threatened with a man-made **fever**?
Saving the Day

• There is a growing body of scientists who claim that we may have as little as 20 years left if we do not act to address global warming.

• Reduction of emissions will reduce further accumulations but can’t reverse climate change.

• The simple message is that the majority of the CO₂ in the atmosphere came from the loss of humus in our soils and when we build rather than lose humus in agriculture, we are sequestering carbon from the atmosphere.
Humus is the stabilising soil glue that determines whether dust storms and floods strip our thin veil of precious topsoil.
The trio most impacting soil, plant, animal, human and planetary health.
Humus and Water Retention

• Soil **water-holding capacity** increases dramatically with increased soil carbon.

• Humus offers the **most efficient** water storage technique as plant roots can access the extra moisture so easily and there is no evaporation.

• An increase of 1% organic matter means that **170,000 litres** of extra water per hectare can be stored.

• This 1% also binds up **132 tonnes** of CO₂ in the soil that would otherwise have been in the atmosphere.
Humus improves the nutritional value of our food.

Humus is the primary vehicle for mineral storage and delivery in the soil.
• Humus reduces chemical contamination of our food.

• The higher the humus levels in the soils the less the need for chemical intervention.

• Humus is a major driver of soil and plant resilience.
Nurturing Your Patch

• Taking care of your own patch of the planet – your garden, can be your greatest personal contribution to the climate change challenge.

• Producing your own flavorsome, chemical-free, nutrient-dense food in your home garden, can also be your ultimate wellness tool.

• Apart from the production of medicinal food, the home garden is now recognised as a primary stress reducing tool. In fact, the smell of a healthy soil boosts serotonin.
Problems with Supermarket Food

Sourcing fresh food from supermarkets has some issues, including:

1. The bundling of food from faceless suppliers breeds less responsibility or motivation to produce clean quality food.

2. The rise and rise of farmers markets and vegetable boxes relates to consumer desire to put a ‘face to their food’

3. I regularly meet vegetable growers who will not eat their own produce. They have a separate patch out the back to produce food for their family.

4. Food miles and logistics means food is picked unripe and ripened in storage, resulting in less vitamins, antioxidants and flavour.
1. **Harvest immediately before consumption**

   - Your home garden allows the opportunity for **champagne food**, picked immediately before it is eaten.

   - There is a tremendous, unrecognised **loss of nutrition** associated with storage of food

   - A snow pea for example loses **50%** of its vitamin C within 12 hours of harvest.

   - Sweet corn loses **40%** within the first 30 minutes

   - Never pick food from your garden and store it in the fridge or you’ve missed one of the major benefits of the garden as a **wellness tool**.
2. Interplant Lucerne with Everything

Lucerne offer 6 distinct benefits:

- They fix **nitrogen** from the atmosphere
- They release acid exudates to break the bond between **calcium** and **phosphate** in your soil
- The acid exudates also encourage **beneficial fungi** to create a highly desirable crumb structure
- The leaves can be harvested as a **highly alkalising**, nutrient-dense addition to salads or green smoothies.
- The **edible flowers** are a sweet delicacy to die for.
- The chop and drop potential provides the best known **fertilising mulch**, attracting both protozoa and earthworms.
3. Use Worm Juice Liberally

- The liquid passed through a worm farm contains billions of beneficial organisms that are unique to the earth worm.

- These organisms stimulate plant growth and provide protection from disease.

- It can be foliar sprayed or applied to the soil and should always be combined with some nutrition.

- A DIY worm farm can be made from a 1000 L shuttle for as little as $200. This can produce luxury amounts of both worm juice and vermi-compost (the very best compost known).
4. Seven reasons to bring back your Earthworms

1. Earthworms are fertiliser machines. Vermicast contains 7 times more phosphorus, 10 times more potassium, 5 times more nitrogen, 3 times more magnesium and 1.5 times more calcium than the surrounding soil.

2. They will seriously increase the infiltration and water holding capacity of your soil.

3. If you could consistently find 25 earthworms per shovelful of your soil they would be contributing 300 tonnes of castings per year.
4. Seven reasons to bring back your Earthworms

4. Earthworms are a limeworks – they have a calciferous gland, which adds calcium carbonate to everything.

5. Earthworms transport minerals from deep in the soil up to the root zone.

6. Earthworms compost 4 times faster than normal composting.

7. Earthworms incubate bacteria that are invaluable in the soil and only found in earthworms.
Reclaiming Earthworms

- The key to restoring protozoa numbers and reclaiming earthworms and nitrogen recycling is to make a **lucerne tea**.
- Lucerne that is organic or free from chemicals harbours huge numbers of **protozoa**.
- The lucerne is placed in a shade cloth, drawstring bag and ‘**brewed**’ for 24 hours with a food source.
- We have seen significant reductions in **N requirements** following applications of lucerne tea.
5. **Correct your soil pH**

- Nutrient uptake is **pH dependant**.
- An ideal soil pH is **6.4**, which ensures you are accessing maximum nutrition from your fresh food.
- You can test your soil pH with an **inexpensive kit** from a hardware store.
- Correction might involve **limestone** on a heavier soil, or a combination of lime and **dolomite** in sandy soil.
- **Gypsum** or sulphur might be required to help reduce soil pH if the soil is too **alkaline**.
- **Calcium** is the single most important mineral flocculating the soil, to allow oxygen entry and CO2 exit.
6. **Direct inject your nutrition**

- No mineral is an island and it is very common for **excesses** in the home garden to limit the uptake of several other minerals. **Phosphate** from chicken manure is a good example.

- **Excess P** shuts down calcium, potassium, zinc, iron and copper. Three of these minerals are key players in resilience.

- **Foliar fertilising** is **12 times** more efficient than mineral delivery via the soil.

- The foliar route is a **direct injection** of nutrition, not limited by mineral dynamics in the soil.
6. Direct inject your nutrition

There are several key tips to successful foliar fertilising including:

- Always direct the spray on the **underside** of the leaf.

- Don’t spray in the middle of the day. **Early morning** or evening are better.

- **Calcium** is particularly important as foliar because this mineral is poorly translocated (Life Force Trio).

- Broad spectrum **trace minerals** (Life Force Total Cover) are also important as they fuel plant immunity and impact flavour.
7. Measure for Mastery

It is important to avoid driving blind when producing high quality food. There are several simple monitoring tools that ensure some precision in our nutrition.

- The refractometer- this simple tool measures food quality. The higher the brix level, the more flavoursome the food, the greater the medicinal value, the longer the shelf life and the more problem-free the gardening experience.

- The refractometer can also be used as a meter to monitor the most important of all minerals - calcium.
7. Measure for Mastery

Sap pH as a problem solver.

- American scientist, **Bruce Tainio**, discovered the pH of plant sap is an invaluable guideline as to crop quality, resilience and productivity.

- There are specialist meters for agriculture, but the home gardener can still benefit with the use of **simple pH strips**.

- Simply squeeze some sap from the leaf with a garlic crusher and place a few drops onto the **NTS pH strip**. A healthy disease resistant plant has a sap pH of **6.4**

- You can use these same strips to monitor your own **acid/alkaline** balance with urine or saliva (6.4 is also your ideal).
8. Organic Matter Matters

- **Humus** is the essence of soil health.

- This sweet smelling soil chocolate is created by microorganisms and serves as their **home base** and **support** system.

- Humus is the **storage** and **delivery** system for all minerals.

- It also houses a suite of microbial exudates that help create **disease suppressive** soils.

- The higher the humus levels, the greater the **nutrient-density** and **medicinal value**, the less the need for stressful pest management and the greater your **gardening pleasure**.
8. Organic Matter Matters

Compost, compost, compost!

• Compost is cornerstone of **gardening vitality**

• Every home needs a compost bin/ pile and a **vermi-compost** station

• Compost is a profound source of biodiversity with over **30,000** different creatures within the 5 billion good organisms found in a teaspoon of good compost.

• Compost is both an invaluable source of **stable humus** and a **triggering** mechanism to reclaim the humus building potential of your garden.
8. Organic Matter Matters

Building a compost heap

• Build your pile in 25 cm layers

• Alternate carbon layers (straw, council mulch, prunings, autumn leaves etc.) with nitrogen layers (manure, lawn clippings, green waste etc.)

• Sprinkle lime, soft rock phosphate, crusher dust, and previous compost (which serves as a starter) on each layer.

• Thoroughly wet down each level as you build your layer cake

• When the pile is complete, cover with wet sacks, or an old carpet, and turn it several times over the next 3 months.
8. Organic Matter Matters

Building a disease suppressive compost

- **Trichoderma** are an amazing multi-purpose species

- They control over **30 diseases**, they create humus, they solubilise phosphorus, they produce root growth hormones and bio-chemicals that **stimulate plant immunity**

- A trichoderma-based compost can be produced in just **4 weeks**.

- It can then be placed around plants to generate a tremendous response, or it can be used as an inoculum for a trichoderma **compost tea**, to manage many diseases.
8. Organic Matter Matters

Building a disease suppressive compost

- Create a DIY composting frame by attaching 1 metre high chicken wire to four star pickets.
- Mix together equal amounts of straw and cow manure and add the mixture into the wire bin at 25cm layers.
- Wet down each layer with a watering can containing diluted trichoderma inoculum (Nutri-Life Tricho-Shield) at the rate of 1 watering can per layer.
- It will take 4 layers to fill your bin. The Tricho-Shield concentrate is included at the rate of two heaped tablespoons per watering can.
- There is no turning involved and at the end of 4 weeks you have created a powerful disease suppressive compost.
8. Organic Matter Matters

BAM Composting

- Anaerobic bacteria are often undesirable, opportunistic pests behind garden disease.
- However, there is another group of anaerobes that are immensely valuable.
- They can protect from disease, while creating humus, stimulating plant growth, delivering minerals and improving soil structure.
- BAM composting delivers a beautiful product in just 8 weeks with a much higher conversion rate i.e. 1000 kg of raw material produces 910 kg of compost, v’s 670 kg for conventional composting.
8. Organic Matter Matters

Making your BAM Compost

• Begin with your 25cm layer of carbon (straw, dead leaves or fine council mulch)
• Sprinkle that layer with lime, crusher dust, soft rock phosphate and trace minerals (if needed)
• Dilute BAM concentrate and apply to the first layer at the rate of 1 L of concentrate per cubic meter.
• The second 25cm layer consists of nitrogen-based materials (lawn clippings, manure, green leaves or lucerne hay). Add extras, as above.
• When the pile is complete, cover it with an air-proof plastic tarp
9. Supporting the Workforce

- When you see your soil life as a **hidden workforce**, you begin to understand that it a workplace health and safety issue.
- When we mistreat our workers, there will be **increasing issues**

**Health** is about providing food and ideal living conditions for your workforce

**Safety** is about protecting them from toxins and poor soil management decisions
9. Supporting the Workforce

- There are two foods to feed the **bacterial component** of your workforce.
- These include **simple sugars**, like molasses and raw sugar, and a powerful natural acid called fulvic acid.
- **Fulvic acid** is the most powerful known bacterial stimulant.
- These tiny creatures (500,000 on a pinhead), fix nitrogen from the atmosphere, deliver minerals, support plant immunity and **protect from disease**.
9. Supporting the Workforce

- **Humic acid** is the second natural acid of tremendous benefit in the garden.
- Humic acid specifically feeds **fungi**.
- Fungi create **stable humus** (lasting 35 years in your soil) and they are responsible for creating the large aggregates (**crumb structure**) that allows your soil to breathe.
- **Life Force Instant Humus** is concentrated humic acid in a soluble granule.
- Simply add one heaped tablespoon to a **watering can** filled with water.
9. Supporting the Workforce

- Kelp is another Nutrition Gardening essential.
- Kelp also contains **complex carbohydrates** to feed fungi but has a myriad of other benefits:
  - **Mannitol**, a powerful chelating agent.
  - Wide range of **minerals** derived from seawater.
  - **4 natural growth promotants** - cytokinins, gibberellins, auxins and betaines.
  - **Vitamins** – can be used by plants and microbes.
  - **Iodine** – Kelp is the highest known source of iodine, which has natural fungicidal qualities.
Ten Tips for a Problem-Free, Super Productive Home Garden

10. Naked soil is never good

• Soil never appreciates exposure

• That is why nature fills the void whenever a soil is uncovered (in the form of weeds)

• Plants provide a living protective cloak over precious top soil to shelter, insulate and sustain.

• Plants feed beneficial soil life with a constant flow of glucose, some of which becomes humus.

• There is a constant dynamic flow of communication between plants and plants, plants and microbes and between all forms of soil-life.
10. Naked soil is never good

Learning to love cover.

Cover crops offer several benefits including:

- **To provide biodiversity** - the dominant principle throughout nature
- **To help manage weeds** - here you can effectively choose your “weeds”
- **To feed soil life** - different plants feed different microbes. The greater the biodiversity above ground, the greater the biodiversity below
Ten Tips for a Problem-Free, Super Productive Home Garden

10. Naked soil is never good

Learning to love cover

To build humus - part of the glucose component becomes humus and when the crop is turned in or cut with a whipper snipper, more humus is produced.

- To prevent erosion - at the current rate of top soil loss (3-5 tonnes per acre per year), there will be zero remaining in just 60 years. Naked soil invites erosion as there is no root stabilizing effect or soil glue.
10. Naked soil is never good
Learning to love cover

To manage pests and nurture bees - plants like marigolds and brassicas, release bio-chemicals that reduce root disease including nematodes. Cover crops can also serve as trap crops for beneficial predators and they also attract and feed pollinators. We all need to nurture bees in our garden.

- Recent German research revealed a 75% decline in flying insects during the past 27 years. Much of the global food chain is insect dependant. Compare your windscreen today verses 10 years ago.
10. Naked soil is never good

The Mulching Imperative

• **Mulching** retains moisture, protects the soil from extremes, and most importantly, it feeds and *stimulates soil life*.

• In this critical strategy for **Nutrition Gardening**, you can protect your soil with straw, council-green waste or cane mulch.

• You may even opt for a fertilising mulch like **lucerne hay**.
Ten Tips for a Problem-Free, Super Productive Home Garden

10. Cocktail cover crops - a soil-building breakthrough

• **Brazilian agronomist** - Aldemir Caligari discovered a revolutionary new way to cover crop.

• He demonstrated that when **five specific plant families** are combined in a cover crop, something amazing happens.

• Plant roots begin messaging each other and initiate the outpouring of **phenolic compounds** into the soil.

• These **anti-oxidants** appear to put soil life into hyper-drive.

• The five species include cereals, grasses, brassicas, legumes and chenopods

• A home blend might include rye grass, barley, wheat, lucerne, 3 clovers, daikon radish, kale and silverbeet – you can produce a **green smoothie** from this crop.
Ten Tips for a Problem-Free, Super Productive Home Garden

10. Cocktail cover crops - a soil-building breakthrough

- **Brazilian agronomist** - Aldemir Caligari discovered a revolutionary new way to cover crop.

- He demonstrated that when **five specific plant families** are combined in a cover crop, something amazing happens.

- Plant roots begin messaging each other and initiate the outpouring of **phenolic compounds** into the soil.

- These **anti-oxidants** appear to put soil life into hyper-drive.

- The five species include cereals, grasses, brassicas, legumes and chenopods

- A home blend might include rye grass, barley, wheat, lucerne, 3 clovers, daikon radish, kale and silverbeet – you can produce a **green smoothie** from this crop.
Healthy soils create hardy people and a happy planet.

In Conclusion