

Permaculture Cairns Inc. Established July, 2007

Web site: www.permaculturecairns.org.au



Permaculture Cairns News

Empowering communities with sustainable solutions

Care for the Earth, Care for people, Share the excess

Care of the Earth, Care of

People. Share the excess

PLEASE NOTE: EARLIER START TIME – 6pm for a 6.30pm START !!!!!!!!!!!!!!!!!!!!!!!

MARCH MEETING AND INFORMATION NIGHT

Tuesday 17TH MARCH at 6pm for 6.30pm start

**Flexible Learning Centre, 90 Clarke Street, Manunda
Clarke Street comes off Hoare on the Salvos Corner.**

Members Free Non-Members \$5

Please bring a plant of food to share and a friend!

AGENDA

Welcome

Workshop and Events Notices

Proposed Events for the year

Permaculture Principle Number 3, a practical explanation

Guest speaker: Fiona George from Terrain Natural Resource Management: Innovation in agriculture is most obviously seen in changed practices in the paddock. However, innovation starts with a thought process that questions the status quo and seeks new solutions, often in response to a disturbance (financial, health, philosophical, inspirational mentor, regulatory). Terrain's role is to find a safe space for innovators to play in: to link with other like-minded people and those who challenge orthodoxy; to share ideas; to find mentors or advisors to help them take the next step (whatever that might be). In order for us to do this, we need to be open to the innovative systems thinkers in our community and beyond. We read widely, we discuss lots, we drink coffee (and beer!) – and we help synthesise ideas into actions where we can. Fiona George, Regional Landcare Facilitator with Terrain NRM will talk briefly on some of Terrain's current disturbances and activities, and answer questions.



Australian Government



**Plant of the Month* Tool of the Month* Book of the Month
Break for a Cuppa, Nibbles and a chance to network with like minded people.**

PERMACULTURE PRINCIPLE NO. 3

Obtain a yield

“You can't work on an empty stomach”

Ensure that you are getting truly useful rewards as part of the work that you are doing.

The icon of this design principle, a vegetable with a bite out of it, shows us that there is an element of competition in obtaining a yield, whilst the proverb “You can't work on an empty stomach” reminds us that we must get immediate rewards to sustain

PERMACULTURE CAIRNS WORKSHOPS

Building Resilient Communities Workshops 2015

Learn to make plants from cuttings and seeds

21st March 2015 - 9.15am for 9.30 start – 12.30 finish



Workshop Presenter:- Lois Hayes

In this workshop you will learn: -

How to save money by making your own plants from cuttings, dividing clumps, from tubers and planting seeds.
How to make your own seed raising mix, and propagation mix.

Registration and payment of the \$20 fee is essential.

Register at workshops@permaculturecairns.org.au

Payments may be made at Cairns Penny in Grafton Street or online to Permaculture Cairns
Account: BSB 704-966 A/C 10009440

Venue : Bungalow Community Gardens cnr Aumuller and Little Spence Streets, Cairns

and THERE are MORE Workshops and Events to COME

PERMACULTURE CAIRNS WORKSHOPS & EVENTS PROPOSED for 2015

April 11th – The Permaculture Garden – Full day workshop with Carol Laing
Covering Permaculture practices and design processes, plants for the Tropics, how and where to grow them, how to grow cool weather vegetables in the dry season, how to improve your soil and keep it rich in nutrients and bacterial life.

VENUE: This workshop will be held at a well established Permaculture garden in the Cairns city area.

TIMES: 9am – 12noon, Half hour lunch break then 12.30 – 3.30pm

COST: Financial Members \$40 Non Members \$50

May – Permaculture Cairns will join with Cairns Regional Council and JCU to participate in Ecoweek 29th May to 7th June and Ecofiesta 31st May. The Wharf will be the venue.

June – Ferro Cement Construction with Bruce Zell – two half day workshops where you will learn what materials are required and how to build using Ferro Cement construction. The second part of this workshop will be to complete a project in Ferro Cement construction. Date, Venue, Cost and Project to be advised later in the year.

To indicate your interest in any of these workshops, please email –
workshops@permaculturecairns.org.au

PAYMENT DETAILS: Permaculture Cairns account at Cairns Penny in Grafton Street or online into that account – BSB 704 966 A/c 10009440 use your Surname as Reference

A BIG THANK YOU TO THE CAIRNS REGIONAL COUNCIL SUSTAINABILITY GRANT PROGRAM FOR MAKING ALL OF THESE WORKSHOPS POSSIBLE.



More WORKSHOPS and EVENTS in the local area

HILL TOP FARM WORKSHOPS – COOKTOWN

With Dr. Wendy Seabrook

Courses begin in March with '[Getting to the heart of Permaculture Design](#)' (Scholarships are available). '[Growing food with less hard Yakka](#)' will be facilitated in different communities throughout 2015. If you have a group that is interested, please contact Hill Top Farm. We look forward to hearing from you. Our full program for 2015 will be released at the end of January.

Getting to the heart of Permaculture Design

Dates: 20 - 24th March 2015

Permaculture at its heart is a design process, where the main focus is creating more sustainable systems. This course provides participants with a toolkit of the Key Ecological Practices we have developed to mimic the functions and processes of healthy natural ecosystems. Nature has had millions of years to fine tune the design of sustainable systems. It therefore makes sense to tap into nature's wisdom in designing more sustainable homes, gardens and farms, as well as communities and businesses.

The toolkit provides a simple and logical framework for sustainable design and decision-making whatever your climate and venture. [See our website for details](#)

The No-Mower Food Grower's Guide

Growing Food with less Hard Yakka

Growing food doesn't need to be such hard work. Dr Wendy Seabrook will take you through the simple and practical steps outlined in 'The No Mower Food Grower's Guide'. Helping you build ecological functioning in your food growing landscape. Whatever your landscape—a private or community garden, market garden or commercial orchard, by working with nature we create more self-maintaining, sustainable food gardens. Food Gardens that save you time, money and 'Hard Yakka'!

[See our website for details](#) Hill Top Farm – working with nature

New [Permaculture course program](#) including scholarships for 2015

INFORMATION ARTICLE

There is a lot of information in this article and Graeme Sait is explaining how his products made at Nutri-Tech Solutions in Queensland, can help make farming easier, so it is also a commercial but one with lots of interesting information.

From GRAEME SAIT OF NUTRI –TECH SOLUTIONS LTD

The Soil Solution

16 January 2015

Soil Health Addresses our Massive Problems

The UN has named 2015 **International Year of Soils** and we should surely embrace this initiative with open hearts and willing hands. It is an incredibly timely focus, in light of a series of serious challenges impacting our future and perhaps our very existence. Soil health directly affects plant, animal and human health. It also impacts topsoil erosion, water management and ocean pollution. Most importantly, it is now recognised that global warming is directly related to soil mismanagement. A global soil health initiative can literally save a planet threatened with a man-made fever.

The Top Five Threats to our Sustainability and Long-Term Survival

While in the UK recently, I met with a professor who shared some deeply concerning findings. He informed me that a recent survey of leading British scientists revealed that as many as **one in five** of the best thinkers in the country believe that we will be **extinct** as a species by the end of this century, or perhaps much earlier. This confronting information should serve to sponsor meaningful action from every one of us. There are five core threats that need to be urgently addressed and they all relate back to the soil. These include:

1. **Loss of topsoil** – at the current rate of topsoil loss, we have just **60 years** before the thin veil that sustains us is no more. This is a huge issue because we will hit the wall way before this six-decade deadline. What is driving this dramatic loss? Basically, it comes down to the massive decline in organic matter following the industrial, extractive experiment in agriculture. We have now lost more than two thirds of our humus. Humus is the soil glue that determines whether rivers run brown following rainstorms or if the winds tear dust from the fragile upper layers of our food-producing soils. Nature teaches us that you must **give to receive**. This universal law is at work in photosynthesis, the single most important process in nature. The plant pumps one third of the sugars it produces from photosynthesis back into the soil to feed the microbes, which in turn fix nitrogen, deliver minerals and protect against plant and soil pests. It is all about giving to receive.

However, this is not a lesson we have applied to our farmland. It is a fairly basic concept that when you remove crops from a field, you are extracting carbon and minerals and you can not just keep taking indefinitely. Unfortunately, this has been the dominant model in many soils for the past century. We have overtilled our soils, oxidised the humus and often ignored the replacement of key minerals that determine the health of humus-building microbes. We have burnt out humus with excess nitrogen at the rate of 100 kg of carbon per every 1 kg of nitrogen oversupplied. We have removed massive amounts of minerals and carbon with ever-increasing yields from our NPK-driven hybridised crops. In many areas we continue to burn crop residues. This senseless practice floods the atmosphere with CO₂, which should have been returned to the soil as humus. Burning also damages soil-life while scorching precious organic

matter in the process. The loss of topsoil has been increasing for a century and now, with the challenge of climate extremes, it is accelerating at quite a pace. Soil health legislation is essential in all of the thirty countries I have visited in the past year and in the International Year of Soils, we all need to be pushing for a **Soil Restoration Bill** to formalise this urgent necessity.

2. **Ocean acidification** is another threat. The oceans have absorbed around half of the CO₂ that has billowed from our soils, smokestacks and cement makers over the past century. This is a planetary self-balancing mechanism, which has helped avoid a much higher global temperature increase. However, there has been a price to pay for this compensatory, carbon redistribution. The CO₂ becomes carbonic acid in the ocean and, as a result, our seas have become increasingly acidic. It is basic chemistry that creatures that make their outer shells from calcium struggle to do so in increasingly acidic conditions. This directly impacts coral, shellfish, phytoplankton, algae and krill, and their struggle for survival has already begun. The key understanding here is that their survival is actually our survival. 500 million of us are directly dependent on coral reefs. Algae and krill are the basic building block for all life in the ocean. Phytoplankton produce 60% of the oxygen we breathe and we have already lost 40% of these creatures. It is a serious situation that is worsening by the month and our only response to date is to talk about reducing carbon emissions. Talk is all we have done. There has been very little action, because the latest figures show a 10% increase in global carbon emissions over this past year. This is the biggest single increase ever recorded, at a time when we are supposedly focusing on critically important reductions. There is a solution to this crisis and it rests in the soil.

3. **Ocean warming** is possibly the most urgent issue at present. Methane is a greenhouse gas that is 23 times more thickening (compared to CO₂) of the heat-trapping blanket that warms our world. **Permafrost** is the phenomenon where ancient organic matter releases methane gas as the ice cover melts. There are currently huge, unanticipated outpourings of methane associated with the rapid thawing of Siberia. However, there is an even more threatening methane-driven phenomenon linked to the loss of ice in the arctic. The arctic oceans house mountains of methane and carbon sludge called **methane hydrates**. This material remains stable at the low temperatures and high pressure found at depths below 500 metres. However, it is now suggested that there will be no summer ice cover in this region within less than two years. This means that the arctic oceans, lacking the reflective effect of the ice cover, will warm much more rapidly. In a recent edition, the prestigious scientific journal Nature warned of a strong potential for a massive "methane burp" from this region within the next two or three years. They suggested that this "burp" could involve 50 gigatonnes of methane in one huge release. This is equivalent to 1150 gigatonnes of CO₂. Here are some figures that help to put this huge release into perspective. The entire man-made contribution of CO₂ to the atmosphere from industry, energy generation and transport since 1860 is 250 gigatonnes. The loss of two thirds of our humus through soil mismanagement represents another 476 gigatonnes. We may be set to see the equivalent of over 150% more CO₂ than that combined total, released in one short time frame. It is a truly frightening scenario that highlights the screaming urgency of a call to action.

4. **Food security and feeding the billions** become increasingly serious concerns as climate change progresses. There is no country I have visited in the past 12 months that has not had serious issues linked to climate change. Brazil, with its biggest drought in 80 years; California, with a three-year killer drought; India, with a belated, substandard monsoon; and large areas of Asia, NZ and Australia impacted with unparalleled weather extremes. It is becoming increasingly likely that these climate-related issues could serve to trigger economic recession or **depression** and that is when the importance of **food security** becomes paramount. In uncertain economic times, you are absurdly vulnerable if you are a country like Qatar, with 6% of the food security of Japan, who produce just 40% of their own food requirements. Turmoil and international aggression come hand-in-hand with financial collapse – it is easy to shut down the imported food supply of another country when seeking to fast-track capitulation. Improving your food security becomes an urgent necessity in this brave new world.

Soil health determines productive capacity. In fact, good soil and water are increasingly seen as "the new gold", in recognition of their expanding importance. **Warren Buffet** is buying up farms with good soil and water, the **Bush family** have just bought the largest aquifer in South America and the Chinese are buying up good farmland across the globe (in countries where it is allowable). The GMO companies have sold us the story that their GM varieties are the solution to feeding a growing world population. However, it is becoming increasingly obvious that these finely tuned hybrids require very specific and precise conditions to deliver their promise. They can be very productive when given the correct fertiliser, moisture requirements and climate conditions but they can really struggle in challenging conditions. In short, they do not have resilience and resilience is the single most important requirement in a world that is becoming considerably less predictable. The more mineralised and biologically active your soil, the greater the crop resilience. There are tens of thousands of examples of this phenomenon. In fact, the obvious validity of a soil health strategy could be clearly contrasted with the failings of the conventional approach in the face of changing conditions. The suicide of 300,000 Indian farmers is partially related to crop failures linked to this lack of resilience in GM crops.

The reality is this: the billions are better fed with humus-rich, living soils that store precious moisture more efficiently and sustain crops that can adapt to and perform in changing conditions.

5.

Declining nutrition in our food and **chemical contamination** of our fresh produce are two other closely-related issues impacting our sustainability. The industrial, extractive agriculture model has seen the constant removal of soil minerals and a loss of two thirds of the humus that helps to store and deliver those minerals. It is common sense to recognise that, every time we take a crop from a field, we are removing a little of all 74 minerals that were originally present in those soils. We replace a handful of them, often in an unbalanced fashion, and we assault our soil life with a smorgasbord of farm chemicals, many of which are proven biocides. When we have bombed the microbe bridge between soil and plant there is a price to pay. The plant suffers, in that it has less access to the trace minerals that fuel immunity, and the animals and humans eating those plants are also compromised. It has been suggested that the food we now consume contains just **20%** of the nutrition found in the food consumed by our grandparents when they were children. The immune-compromised plant will always require more chemical intervention, and repeated studies have demonstrated the cumulative effect of chemical residues in our bodies. This serious scenario is all about minerals and microbes, and they, in turn, are housed by **humus**.

Humus Saves the World

It may seem like something of an oversell to claim that the sweet-smelling, chocolate brown substance that determines soil fertility could really pull us from the mire. The key understanding here involves a recognition that you can't make more carbon. The number of carbon molecules present on our planet has remained constant since the dawn of time. This carbon is either stored in the soil as humus, the carbon-based life forms, or the atmosphere as CO₂, and it cycles between these three. The problem is that a great deal of the carbon that used to be in the soil as humus (over two thirds) is now in the atmosphere, thickening the blanket and trapping more heat.

The very simple and obvious solution is to return some of that excessive atmospheric carbon back to the soil as stable humus. When we build organic matter (humus) in the soil we have effectively sequestered carbon from the atmosphere. This is a difficult concept to grasp for some people, but if you realise that you can't make more carbon, it becomes clear that if it is returned to the soil, it is also removed from the atmosphere. How effective is this strategy, you may be thinking, and could it be the solution? **Professor Rattan Lal** is, perhaps, the leading scientist driving this humus awareness. He has suggested that an increase in organic matter in the top six inches of the soil can effectively **counter 30% of man-made carbon emissions**. This is an extremely conservative estimate because carbon sequestration via humus-building happens at depths much greater than 6 inches. The roots of plants release glucose, created from photosynthesis, to feed the surrounding soil biology. Some of this glucose is converted to humus in the soil. In this context, root depth determines the depth and scale of carbon sequestration in the soil. The fact is that many plants have roots that extend much deeper than six inches. Recent studies, for example, have identified Australian native grasses with roots that extend well over a hundred feet down into the soil.

A review of recent climate change science reveals a common and depressing overuse of the term "**irreversibility**" in appraisals of our future. If we constrain ourselves to the concept of reducing carbon emissions as our sole action strategy, this negative appraisal may be justified. However, when humus-building is incorporated into that game plan, the story changes. A global increase of 1.6% organic matter is sufficient to reduce CO₂ levels in the atmosphere from 400 ppm to below 300 ppm, which effectively reverses global warming. The burning question remains – how do we do this within the short time frame involved?



How It Can Be Done: Ten Solutions That Must Become Government or Personal Policy

1.

Composting becomes standard practice wherever it is possible. On every farm, every council and in every home garden, we compost or add compost. Composting involves the conversion of organic matter into

stable humus, but it is much more than that. When we add compost to a soil it stimulates and regenerates the soil life responsible for building humus. We did not just add some stable humus to our soil with the compost inclusion, we triggered our existing soil life to build humus much more efficiently and rapidly. The single most important breakthrough in the science of composting is the finding that the inclusion of 6-10% of a high-clay soil to the compost facilitates the creation of a clay/humus crumb where the humus created lasts for much longer in the soil. In fact, it remains stable in the soil for up to 35 years (compared to a bacterial-dominated compost, based on something like lawn clippings where this "active humus" is only stored in the soil for around 12 months).

2. **Mycorrhizal fungi (AMF)** become the most important creatures on the planet at this point in time. These endangered organisms, of which we have lost 90% in farmed soils, produce a sticky, carbon-based substance called **glomalin**. It is now understood that glomalin, in turn, triggers the formation of 30% of the stable carbon in our soils. This is massive – one soil organism could single-handedly turn things around! It is an inexpensive strategy to reintroduce these missing creatures to farmed soils. NTS, for example, has developed a mycorrhizal inoculum called **Platform®**, where AMF can be effectively reintroduced for as little as \$10 AUD per acre. Recent research has also demonstrated that compost has a remarkable capacity to stimulate both existing mycorrhizal fungi and introduced AMF, so our first two solutions are inextricably intertwined (as are several of these proposed solutions).

3. **Protection of soil life**, and their humus home base, becomes an essential strategy. There is little point in reintroducing beneficial microbes with one hand and then promptly destroying the new population with the other. How did we lose **90%** of our AMF and seriously compromise cellulose-digesting, humus-building fungi in general? The use of unbuffered salt fertilisers dehydrates and kills many beneficials, over-tillage slices and dices AMF and oxidises humus and we have often neglected to feed and nurture this important workforce. However, the single most destructive component of modern agriculture, in terms of soil life, has been **farm chemicals**. Some of the herbicides are more destructive than fungicides in removing beneficial fungi. Fungicides can sometimes take the good with the bad and nematicides are the most destructive of all chemicals. There needs to be legislation to regulate chemicals that are killing the microbes that may determine our long-term survival. In an extractive model, where the soil is viewed as an inert medium in which the plant stands, this has not been a concern. However, as the science floods in, we are thankfully recognising the critical importance of the soil as a living medium and change is underway.

4. A **carbon source** must be included with all **nitrogen** applications. If we investigate how we lost two thirds of our soil carbon, it becomes apparent that mismanagement of nitrogen is a major player. This is not just an issue relevant to loss of carbon – agriculture currently contributes 80% of the greenhouse gas, nitrous oxide, which is **310** times more potent than CO₂ in terms of its global warming side-effect. Here's how it works: nitrogen stimulates bacteria, because these creatures have more need for nitrogen than any other organism (17% of their body is nitrogen). The bacteria seek carbon after this nitrogen feeding frenzy to balance out their unique 5:1 carbon to nitrogen ratio. In the absence of applied carbon, they have no choice but to target **humus**. They would never choose to literally eat themselves out of house and home, but we give them no choice. The destruction of humus via the mismanagement of applied nitrogen is a major factor that can be easily addressed. This is no small thing. Research demonstrates that we lose 100 kg of carbon for every 1 kg of nitrogen applied over and above what is required by the plant at the time. Think of large applications of starter N, where a young seedling cannot possibly utilise that much nitrogen. We need to regulate N applications, to adopt foliar application of N (which can be dramatically more efficient) and to include a carbon source with every nitrogen application. The carbon source offers an alternative to eating humus. This might include molasses, manure or compost but the best choice is **NTS Soluble Humate Granules™**, a carbon-dense source of concentrated humic acid, that also stabilises and magnifies the nitrogen input.

5. **Tillage must be modified**. There is compelling research demonstrating the humus-building effect of no-till or minimum-till agriculture. Much of this comes from the **Rodale Institute** and their 25 years of in-depth research, quantifying humus-building dynamics. Every time we work the soil we disturb cellulose-

digesting fungi and oxidise existing humus. I favour minimum-till over no-till, as there is evidence of mineral stratification that occurs over time in completely untouched soils. It makes sense that a combination of leaching and utilisation will see key minerals slowly move beyond the root zone. If we stir things up from time to time, this negative stratification effect can be countered.

6. **Green manure and cover crops** must become indispensable carbon-building tools for all of us. This is an integral component of a Nutrition Farming® approach, where we are always striving to feed the soil while converting plant material into humus. There is a rural myth among some growers that, in dryland situations, these crops will steal moisture from the subsequent cash crop. This is not research-based. All of the evidence suggests that the increased moisture retention associated with this regular injection of organic matter more than compensates for the moisture removed in the production of the cover crops. There is compelling new US research that **cocktail cover crops** may be particularly beneficial. It has been found that certain combinations of plants, typically involving cereals, grasses, brassicas, legumes and chenopods, can trigger the release of phenolic compounds from these plant roots, which have been shown to stimulate rapid humus building. The brilliant American consultant, **Jerry Brunetti**, who sadly passed away in 2014, has included a particularly successful cocktail cover crop recipe in his parting gift, a wonderful new book entitled "The Farm as an Ecosystem". Cocktail cover crops sponsor microbial biodiversity because each species tends to favour and feed specific groups of root organisms. The more diverse the plant species, the more varied the soil life – and nature thrives on biodiversity. The brassicas in the mix can also discourage pathogens like nematodes and some diseases with their biochemical root exudates. Cocktail cover crops are also profoundly drought protective, in that the great mass of roots involved exudes a gel-like mucilage that can absorb ten thousand times its own dry weight in water. The trillions of bacteria around the roots also release a gel-like substance that provides them protection from predators but also serves to retain water. Brunetti cites a cocktail mix that has proven tremendously successful for North Dakota farmer, **Gabe Brown**, who has, in turn, been inspired by the innovative work of Brazilian agronomist, Dr Ademir Caligari. This mix includes at least a dozen of the following species: pearl millet, sorghum sudan grass, proso millet, buckwheat, sunn hemp, oilseed radish, turnips, pasha, ryegrass, canola, phacelia, cowpeas, soy beans, sugar beets, red clover, sweet clover, kale, rape, lentils, mung beans and subterranean clover. This mix includes the desired mix of legumes, grasses, cereals, brassicas and chenopods. It also involves cool season grasses and broad-leaved plants combined with warm season grasses and broad-leaved plants.

7. **Intelligent grazing** must be encouraged or incentivised to the point of legislative management. The dictionary definition of the word "science" is "adherence to natural laws and principles". Real science involves learning from the perfect blueprint of nature, rather than the futile attempt at improving upon nature that has characterised much of profit-based, scientific endeavour. In this context, we might examine nature to determine which soils on the planet have been most productive. The Great Plains in the US captured more carbon and produced more biomass than any other region on Earth. This amazing productive capacity was driven by huge herds of bison that moved into one area for a day, depositing massive amounts of urine and dung and creating a seedbed with their hooves for improved germination of the diverse range of seeds present in their dung. In effect, they facilitated a cocktail cover crop, or pasture crop in this case. The herds tended to graze down to about 4 inches before moving on, almost as though they were aware of the fact that the leaf is the solar panel that fuels photosynthesis. The plant pumps down 50% of its photosynthates (glucose) to the roots, and 60% of this carbon is exuded into the soil (30% of total glucose production). The whole carbon-building mechanics of the pasture are impacted by the length of the leaf, because the roots, which are being fed by the leaves, prune themselves back in accord with leaf size. If you have grazed down to a bowling green, the root mass has reduced accordingly and you no longer have a carbon-building pasture. Researchers like **Dr Christine Jones** in Australia have conclusively demonstrated that correctly managed pasture has the most carbon-sequestering capacity of any crop. Ruminants may yet be our savior, but only if we learn from nature and broadly adopt grazing practices where a post-grazing leaf length of 4 inches becomes the gold standard.

8. **CAM plants** involve something called Crassulacean Acid Metabolism, where their stomates remain open during the night, but close during daylight. This allows much more efficient photosynthesis and much better water utilisation (around 500% better). These plants thrive in hot, arid conditions, in low humus soils.

Their role in these conditions is to maximise the benefits of minimal moisture, while pumping more sugars into the soil to build carbon in these barren soils. The good thing about these succulents is that they are absurdly easy to propagate. You simply break off a piece of plant and poke it into the soil. In suitable countries, the unemployed could plant trillions of these plants across areas that have been desertified by mankind's footprint. We could improve those soils while sequestering massive amounts of carbon from the atmosphere. One of the CAM plants, surprisingly, is Moringa, which is one of the most nutrient-dense food plants on the planet.

9. **Humates** become the most important of all farm inputs, from a humus-building perspective. Humic acid is the most powerful known stimulant of the cellulose-digesting fungi that build stable humus. It also holds seven times its own weight in water, which, of course, benefits crops and soil organisms. Humates improve root growth and soil structure and buffer the dehydrating (biocidal) impact of salt fertilisers. These inputs are effectively cost neutral, so they remain a viable option even in subsistence farming. This "free" status is based upon the well-researched capacity of humates to magnify nutrient uptake by one third, via a phenomenon called "increased cell sensitisation". Soluble humic acid granules are combined with fertilisers at the rate of 5%. The cost of this inclusion is deducted from the fertiliser bill (i.e., a little less fertiliser is used to accommodate the cost of the humate additive). The proven 33% increase in fertiliser performance ensures that there is no risk factor associated with the small reduction in applied fertiliser. Soil, plants, animals, humans and the planet can all be beneficiaries of what is essentially a cost-free input.
10. **Biochar** is based upon the discovery of terra preta soils in the Amazon that seem to be self-generating and expanding. They feature humus-rich topsoil metres deep and they expand out beyond the villages from which they originated. It has been found that this remarkable fertility appears to originate from charcoal that was added to the soil from cooking fires. On the basis of this finding, the concept of manufacturing biochar as a humus-building soil additive has attracted considerable interest and associated research funds. I have been concerned that we had only really embraced half of the story. The amazing terra preta soils must surely involve specific microbes in a synergy with charcoal. We trialled a variety of task-specific organisms and broad-spectrum inoculums, like compost tea, in conjunction with biochar. However, we could not identify the specific synergy that turns biochar from inert carbon into a profound soil-building mechanism. Recently, I have had meetings with microbiologists who claim that the key synergist may be **mycorrhizal fungi**. This was a species we never researched but it seems highly likely that this is the key. Mycorrhizal fungi produce glomalin, which is responsible for 30% of soil humus. If these creatures were to move into hyperdrive, in the presence of biochar, it would explain the rapid soil-building phenomenon that is terra preta (black earth).

In Conclusion

2015 is the **International Year of Soils**. This UN initiative encourages a timely focus upon the importance of the thin veil of topsoil that sustains us all in so many ways. The soil glue that stabilises topsoil is humus. We have lost two thirds of our humus as a result of industrial, extractive agriculture and it is now time to address that issue. The words "human" and "humus" mean the same thing. They mean "of and for the earth". If our core purpose is to nurture and sustain the precious soil that supports us, then we have strayed a little on our path. It is not too late to recognise that mistake and move forward to make this critically important year the turning point.

Graeme Sait

Read [more posts](#) by this author.

An Article from 'The Conversation'

Six things Queensland's next government must do to save the Great Barrier Reef

The Great Barrier Reef is a national and global icon, inscribed on the World Heritage List in 1981. Since then, it's become apparent that this vast array of marine ecosystems – stretching along 2,300 kilometres of Queensland's coast – is in trouble.

The reasons? Inadequate management of human activities in and around the reef, only made worse by climate change.

Unfortunately, [federal and state governments](#) have not done enough to help, while doing a lot to make matters worse.

With only a fortnight of campaigning left before Queenslanders go to the polls, both the [Liberal National Party \(LNP\)](#) and [Labor](#) have targeted dumping of dredge spoil as a high-profile problem. Labor has also raised the stakes with ambitious targets for improving [water quality](#).

But the current promises from the major parties simply don't go far enough.

If they really want to avoid seeing the reef added to UNESCO's list of World Heritage sites "[in danger](#)" – which is [being considered](#) and which could [damage the state's reef-dependent tourism](#) – there's more work to be done.

Here are six things Queensland's next government must do to save the Great Barrier Reef for generations to come.

1. Fix the reef's catchments



CSIRO flood plume image from 2007 showing sediment (brown) and nutrient-rich (green) floodwaters reaching the reefs of the Great Barrier Reef in Princess Charlotte Bay. AAP/CSIRO

Click to enlarge

The reef's catchments cover 424,000 km², or 23% of Queensland. Grazing, cropping, plantation forestry, mining, construction and urban development in the catchments all add pollutants that are a major cause of the [reef's decline](#).

The current targets for pollution reductions in the state and federal government's [Reef Plan 2013](#) are too small.

Halting and reversing the decline will need reductions of 80% and 50% in nitrogen and fine sediment loadings, respectively. That's more than double the current targets.

Labor has committed to achieving these targets by 2025, although it has offered little detail yet on *how* that would be done, other than promising to listen to an expert taskforce including scientists, tourism operators, conservationists, local government and others.

And the cost? Labor leader Anastacia Palaszczuk announced an additional [A\\$100 million over five years](#).

That will certainly help – but it won't be enough. Still, Labor's promise to work out the full cost is important.

What the next Queensland government must do: Recognise that the problem and required investments are similar in scale to improved management of the Murray-Darling Basin, then work with the federal government to sustain those investments over the next 20 years. Prioritise actions for improved water quality across all the reef's catchments, while maximising shared benefits in the catchments themselves by looking after native land- and freshwater-based species, as well as cutting greenhouse gas emissions through vegetation management. Exercise zero tolerance for reductions in water quality in the reef's north, where adverse impacts to date have been minimal.

2. Look after the reef's islands properly



Hinchinbrook Island, one of 1000 islands within the Great Barrier Reef. [Flickr/Blue♦Gum](#), [CC BY-ND](#)

Click to enlarge

The Great Barrier Reef World Heritage Area includes about 1000 islands, ranging from tiny coral cays to the mountainous [Hinchinbrook](#). The state government is responsible for most of these islands and about 400 are in Queensland national parks.

The islands support globally and nationally important populations of threatened species, including large breeding colonies of turtles and seabirds. These populations are under increasing threat, mainly from invasive [plants](#) and [animals](#). Yet funding for management, which has never been adequate, is being reduced.

What the next Queensland government must do: Increase management funding for the reef's islands by an initial 100% (still less than required), then fully cost adequate management of high-priority islands. Develop a better system for strategic management, so that the most important islands and most urgent threats receive attention first. Develop a [biosecurity strategy](#) that balances investment in quarantine (at source points for invasive species), surveillance (for early detection of outbreaks) and control (after outbreaks have occurred).

3. Sort out fisheries

The Queensland government is responsible for most of the reef's fisheries. Commercial and recreational fisheries are [among the highest threats](#) to the reef's ecosystems, and there is increasing non-compliance with the 2004 management zones.

Non-target species – including inshore [dolphins](#), turtles and dugongs – remain at risk. Reductions are still needed in some commercial fisheries. Of critical concern is the offshore component of the East Coast Fin Fish Fishery, with many [required improvements](#) not implemented.

What the next Queensland government must do: Manage the reef's fisheries to world's best practice, with ecological sustainability a core principle. Amend the Queensland Fisheries Act to recognise the global importance of the reef and incorporate the principles of the reef's [Intergovernmental Agreement](#) and all related marine park legislation. Fund independent, robust stock assessments to identify allowable take. Require all commercial vessels, regardless of size, to carry vessel monitoring systems. Exercise zero tolerance for repeated non-compliance.

4. Fix environmental impact assessments

In principle, environmental impact assessments (EIAs) enable the Queensland government to consider potential impacts on the reef when deciding whether to approve development projects.

In practice, the EIA process is token, giving the false impression that harmful developments are being regulated.

EIAs lack independence and quality control of data, and make mistakes with impunity. The LNP's policy of [cutting green tape](#), combined with the new ["one-stop shop" for environmental approvals](#), makes these problems worse.

Assessment of [cumulative impacts](#) – essential to understand how the reef is dying by a thousand cuts – is primitive.

What the next Queensland government must do: Put the reef's long-term value before short-term profits. Develop and apply world's best methods to assess cumulative impacts. Ensure proponents consider all direct and indirect impacts of their developments. Make baseline and monitoring data for EIAs publicly available. Require independent quality control and peer review of EIAs.

5. Forget environmental offsets – or at least make them honest

Offsets are environmental reparations that compensate for adverse impacts of developments.

In principle, offsets can be managed to achieve net benefits. Key requirements are to avoid and mitigate first, leaving offsets as a last resort, then decide if remaining impacts can be offset at all (some cannot). If they can, then offsets can be designed and costed, ensuring that long-term funds and guarantees are in place, with checks on progress, *then* consider approval.

[In practice](#), offsets are little more than empty promises to accelerate development at all costs, while giving the false impression that the reef will be fine.

What the next Queensland government must do: Follow [internationally recognised guidelines](#) to decide if offsets, as a last resort, are feasible. If they are, design them to achieve net benefits for the reef. Ensure that offsets remain direct (provide measurable conservation gain) and avoid financial capture of agencies that approve developments. Insist on adequate bonds or levies from proponents as insurance.

6. Leave the coal in the ground, or else explain how it won't damage the reef



Coal is stockpiled before being loaded on to ships at Gladstone, which is at the southern end of the Great Barrier Reef. AAP Image/Dave Hunt

Click to enlarge

Both the LNP government and its Labor predecessors have [over-sold](#) the importance of coal to Queensland's economy.

The LNP has approved five new coal-mining operations in the Galilee Basin. Deputy LNP leader Jeff Seeney has also pledged [“hundreds of millions of dollars, I wouldn't say billions”](#) to partly fund new infrastructure in the Galilee Basin to speed up coal developments, although few details have been shared with Queensland taxpayers.

With existing mines in the Bowen Basin, the coal will be exported through the Great Barrier Reef. The indirect impacts, including port expansion, dredging and shipping, are not considered in EIAs for the mines. Separate assessments of new [port developments and dredging](#) have been expedient and low-standard. EIAs for the mines also ignore their contributions to greenhouse gas emissions when the coal is burned, which will have a [measurable effect](#) on global warming and further harm the reef.

What the next Queensland government must do: Stop exporting [thermal coal](#) (for electricity generation), for which there are renewable or lower-emission substitutes. Employ Queenslanders by making the Sunshine State a world leader in development and export of technical expertise and products for renewable energy. Continue to export higher-quality [metallurgical coal](#), which is crucial in the iron and steel making process, but through well-managed ports.

TABLELANDS LETS - MARCH CALENDAR

TABLELAND LETS - Relocalising all of Far North Queensland

What to bring to Trade Events where not specified above: food & drinks for yourself or to share, or money and/or Bartles at some venues, friends, Trading Record Sheet and pen, any goods you wish to trade, table/rug to display them upon is often useful, your own chair at some venues, promotional material of any services you are offering if applicable, \$20 to join LETS if you are not yet a member.

tablelandlets@gmail.com - 4096 6972 - tablelandlets.org - www.communityexchange.net.au

Informative, useful and Interesting Websites:

Sign up for news from The Permaculture Research Institute and Geoff Lawson on all things Permaculture - articles, forums, courses, videos and heaps more.

This is the most informative site on Permaculture in Australia and possibly the world. <http://permaculturenews.org/>

<http://www.aussiebee.com.au> All about Australian Bees – including a recent update in December 2014

<http://www.greenliving.com>: An Australian website for supplies for fermenting, cheese and yoghurt making, lids for preserving bottles, book on preserving foods and heaps more.

<http://www.culturesforhealth.com> A USA website with lots of info. recipes, free eBooks on fermenting foods and lots more. You can sign up for their weekly newsletter. “And therein lies the lure of fermentation. As Pollan writes in Cooked, its deliciousness is the by-product of decay, and decay is a fermentor's dream and a food regulator's nightmare. But the times they are a'changing: recent medical research has concluded that one of the problems with the Western diet is the absence from it of live-culture foods, while another study has linked the intake of certain probiotics found in some ferments to improved mental function and mood. We need more decay, it seems, not less. So pass the sauerkraut, please. I've heard it can even cure middle age.”

<http://care2.com/greenliving/>

This website has lots of interesting topics, food that is banned elsewhere but still available in the USA, good alternative recipes for making healthy food eg. ice cream and lots more.

<http://manybooks.net> A place that offers free downloads of books – check out “Farmers of forty Centuries” by FJ King written 1911 after or during a trip to China, Korea and Japan. This incredible book explains how these peoples have been growing food for centuries. Check to see if Bread from Stones is there, another interesting read.

<https://www.organicgardener.com.au> Lots of info and a great planting guide for the year.

<http://rfearchives.org.au/index.htm> - Rare Fruits council of Australia – Fruit/Nut Trees and lots Recipes

PERMIE RESOURCES, & SERVICES

RESOURCES:

PERMACULTURE INFORMATION BOOKLET:

“Notes from the Workshops”

The notes from the 12 Permaculture Cairns Resilient Communities Workshops are now available for purchase at meetings and at Enviromart Australia on corner of Scott and Aumuller Street, **FULL OF LOCAL KNOWLEDGE** about growing and living in an environmentally friendly way in the tropics.

TOPICS COVERED:

How to Grow your own Fabulous Organic Food All about Earthworms Growing Microgreens
All about Wicking beds All about Aquaponics Composting Creating a
raised garden bed Tropical plants that grow all year round and recipes for cooking these Drying and
preserving excess fruit & veg Balcony and patio gardening The Bokashi Bucket
Poultry in the city A Sprouting guide Vegetables for the small tropical farm or garden
Waste not want not – recycling organic waste

EAT YOUR LANDSCAPE Plant Easy to Grow Edible Tropical Vegetable in your garden. Grow plants suitable for the tropics and have them in the garden all year round, never be short of a green vegetable again. Tropical Vegetables and useful Plants are available from Enviromart Australia on corner of Scott and Aumuller Street or phone Carol 0414900717 for an appointment.

SERVICES

Garden Advice - Do you need help to plan or build your garden???

Bruce Zell, Director of The Back Yard Revolution is a Permaculture Diploma Graduate, Licensed Structural Landscaper and has extensive experience in landscaping, food garden design and implementation, Project Management and more.

Contact Bruce for more details-

email: brucezell@gmail.com, www.backyardrevolution.com.au or Mob. 0404 9944 528

AND IF YOU HAVE SOME USEFUL INFO YOU WOULD LIKE TO SHARE, PLEASE EMAIL ME AT:-

newsletters@permaculture Cairns.org.au

THE BENEFITS OF BEING A FINANCIAL MEMBER AND BECOMING INVOLVED

Eleven Monthly meetings, with information, movies/videos and presentations from informative and interesting members and guest speakers

Learn more skill by attending tours of gardens and farms and other relevant sites

Learn more about Permaculture practices and principles by attending Workshops

Receive discount on most Workshop Fees organised by Permaculture Cairns

Get access to plants and seeds and other resources through sharing

Networking with people of similar interests from other organisations in the area eg Seed Saver Groups, BioDynamic Group, Local Exchange Trading System aka LETS, Community Garden Groups, Non Government Organisations like Terrain and Northern Gulf Resource Management Group.

Monthly Newsletter with information and Permaculture news from around the world

Notices of Events and Courses by Permaculture Cairns and other relevant businesses, and organisations - not all of these notices will be in our newsletters if they have missed the issue deadline.

Free access to our Library books on Permaculture Subjects

Continue learning about Permaculture through shared knowledge and experience

Learn how to live gently on this earth – Care for the Earth, People and Nature

Meet and make new friends.

Please note Memberships fees for 2015 are due and payable NOW

Memberships form may be completed online on our web site and emailed to us from there. Our Bank account details are on the membership form so you can pay online,



Permaculture Cairns

Membership Form 2015

One year's membership fee - 1 Jan - 31 Dec:

- Household membership \$30 Renewing Member
 Individual membership \$20 New Member

Name(s) of all applicant(s) & DOB if under 18yrs:

.....
.....
.....

Postal Address:

..... Postcode:

Phone(s):

Email:

Signature:

Payment may be made at Meetings, at Bank or Online Direct Deposit - Permaculture Cairns Account at Cairns Penny Bank in Grafton Street. BSB 704-966 Account No. 100009440 please include your Surname as reference.

Do you have skills that you would be willing to share that would be of help to Permaculture Cairns? If so please give details below-

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Permaculture Cairns Public Meetings - All Welcome Third Tuesday of month Feb to Nov (Second Tuesday Dec). Doors open 6pm, meeting starts at 6.30pm at: Flexible Learning Centre, 90-92 Clarke St. (off Hoare St), Manunda

Enquiries

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Treasurer: Jenny McGrath treasurer@permaculturecairns.org.au

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