



**Willunga Hillsface Landcare Group**

## *The Green Challenger*

Official Newsletter  
of the  
Willunga Hillsface  
Landcare Group

Autumn 2011

# The story of Phosphorus: 8 reasons why we need to re-think the management of phosphorus resources in the global food system

BY DR DANA CORDELL

RESEARCH PRINCIPAL, INSTITUTE FOR SUSTAINABLE FUTURES, UNIVERSITY OF TECHNOLOGY, SYDNEY (UTS) AUSTRALIA AND  
DEPARTMENT OF WATER AND ENVIRONMENTAL STUDIES, LINKÖPING UNIVERSITY (LiU) SWEDEN

## **Phosphorus (P)**

Phosphorus is an essential nutrient for all plants and animals. We get our phosphorus through the food we eat, which has been fertilized by mineral or organic phosphorus fertilizers. Where the phosphorus in our food comes from and how sustainable it is in the long term is often not the topic of debate or significant investigation.

Modern agricultural systems are dependent on continual inputs of phosphorus fertilizers processed from phosphate rock. Yet phosphate rock, like oil, is a non-renewable resource that takes 10-15 million years to cycle naturally. While all farmers need access to phosphorus, just 5 countries control around 90% of the world's remaining phosphate rock reserves, including China, the US and Morocco (which also controls Western Sahara's reserves). Studies suggest current high-grade reserves will be depleted within 50-100 years. Further, peak phosphorus could occur by 2030. While the exact timing might be disputed, it is widely accepted that the quality of phosphate rock is decreasing and costs increasing. In mid 2008 the price of phosphate rock reached a peak 800% higher than early 2007.

The phosphorus situation has many similarities with oil, yet unlike oil, there is no substitute for phosphorus in food production. Phosphorus cannot be manufactured, though fortunately it can be recovered and re-used over and over again.

### **1. Phosphorus equals food**

Phosphorus is essential for all living matter, including bacteria, plants and animals. We get our phosphorus from the food we eat, which in turn comes from the phosphate fertilizers we apply to crops. P fertilizer is essential for modern food production and is the limiting factor in crop yields. P is a critical global resource,

along side water and energy resources.<sup>1,2,3</sup>

Around 90% of the phosphate rock extracted globally is for food production (the remainder is for industrial applications like detergents).<sup>4,5</sup>

### **2. A key non-renewable resource**

The majority of the world's agricultural fields today rely on fertilizers derived from inorganic minerals, such as phosphate rock. Phosphate rock is a non-renewable resource that takes 10-15 million years to form from seabed to uplift and weathering, and current known reserves are likely to be depleted in 50-100 years.<sup>4,5</sup>

Phosphate rock reserves are highly geographically concentrated, and thus only exist under control of a small number of countries, including China, Morocco (who controls Western Sahara's reserves), and the US. The US has approximately 25 years of reserves remaining, while China has recently imposed a 135% export tariff to secure domestic fertilizer supply, which has halted most exports. Western Europe and India are totally dependent on imports.<sup>4,5</sup>

Importing Western Saharan P rock via Moroccan authorities is condemned by the UN and trading phosphate rock with Morocco has recently been boycotted by several Scandinavian firms.<sup>6,7</sup>

### **3. Peak P: no substitute?**

Like oil and other natural resources, the rate of production of economically available phosphate reserves will eventually reach a peak, followed by a steep decline and subsequent ongoing decline of productivity. An analysis based on industry data shows the global peak P is expected to occur around 2034 (see Peak Phosphorus).<sup>8</sup>

While oil and other non-renewable natural resources can be substituted with other sources when they peak

*Continued on Page 4*

## Editorial ramblings

Our November meeting, which seems like aeons ago was reasonably well attended, but we would have liked to see more interest in this subject from our members. Whatever we are growing, looking after our soil is of prime importance and Biochar could be important in the future if not now.

There is a commercial product on the market now available from S.A. Composters, 50 Liston Road, Lonsdale, SA 5160. (08) 8387 4221. More information is available at: [www.blackearthproducts.com.au](http://www.blackearthproducts.com.au)

I have recently been reading a book borrowed from our local Library called "*Dirt – the erosion of civilizations*" by David R. Montgomery, (Professor of Earth and Space Sciences at the University of Washington).

His published work includes studies of the role of topsoil in human civilization...the evolution of mountain ranges, and the use of digital topography. I found this very interesting. The following is a brief quote from page 232 of this book...

*"the experiences of societies on islands around the world remind us that Earth is the ultimate island, an oasis in space rendered hospitable by a thin skin of soil that, once lost, rebuilds only over geologic time."*

We don't think of ourselves as living on the island Earth, so what's he talking about? You'll need to read the book to find out, but human beings have been abusing our most precious commodity as if we could just go down to the supermarket and buy some more when we're running short. We could buy something that resembles soil, but the real thing takes generations to build.

John Campbell, our President, said in our last newsletter that the role of "City farms" would be important in developing community and agricultural sustainability. Unfortunately John hasn't been able to follow up on this, but I have recently come across an article in the May/June *Organic Gardener* that is very interesting.

A movement has been started here called 'Landshare Australia' and they have a website for anyone wanting more information about them, which is: [landshareaustralia.com.au](http://landshareaustralia.com.au)

The basic idea is a simple method of connecting growers with people that have land to share. The website makes it easy to log in and register your interest either as a grower, supporter, or have land to share.

### Landshare is for people who:

- \* Want to grow vegetables but don't have anywhere to do it
- \* Have a spare bit of land they're prepared to share
- \* Can help in some way – from sharing knowledge and lending tools to helping out on the plot itself
- \* Support the idea of freeing up more land for growing
- \* Are already growing and want to join in the community.

"Increasing public concern for food miles, damaging agricultural practices, mounting food prices and a desire to get back to old-fashioned flavour has generated a dramatic rise in people wanting to grow their own organic fruit and vegetables," says Landshare Australia co-founder and ABC radio 'garden guru' Phil Dudman.

There is also another movement going called "Community Supported Agriculture." The main aim of this is sustainably produced food, bought at a fair price, delivered to your area. Websites that I know of are as follows: [www.foodconnectadelaide.com.au](http://www.foodconnectadelaide.com.au); [www.cleanfood.com.au](http://www.cleanfood.com.au); [www.purplepear.net.au](http://www.purplepear.net.au); [www.biodynamic-food.com](http://www.biodynamic-food.com); [beanstalk.org.au](http://beanstalk.org.au); [www.nearriverproduce.com](http://www.nearriverproduce.com)

Over the last 20 years (in the US), Community Supported Agriculture (CSA) has become a popular way for consumers to buy local, seasonal food directly from a farmer. Here are the basics: a farmer offers a certain number of "shares" to the public. Typically the share consists of a box of vegetables, but other farm products may be included. Interested consumers purchase a share (aka a "membership" or a "subscription") and in return receive a box (bag, basket) of seasonal produce each week throughout the farming season.

In Australia there are only about half a dozen CSAs at the moment. However, the great joy of CSAs is that food is straight from the farm – often picked and delivered on the same day. It's so much fresher than food in the supermarkets or even standard organic food boxes. So, providing farmers do the right thing by their customers this system should work very well.

### Legislated protection of Willunga Basin

Readers will be aware of the public announcement by Premier Mike Rann and our new Urban Development (and Food Marketing) Minister, John Rau. Mike Rann stated:

"We want to make sure the Barossa and McLaren Vale never become suburbs of Adelaide" and "It is one of the Jobs I have given John Rau – how we preserve, through legislation, the integrity of the Barossa and McLaren Vale".

New initiatives are gathering pace to protect South Australia's iconic wine regions and Hills' farmland.

The battle to stop rampant urban sprawl has intensified with two new political initiatives and a proposal for UNESCO World Heritage Status over huge swathes of rich agricultural land – stretching from the Clare Valley to Fleurieu Peninsula – breathing hope into the debate.

While the future is far from clear following a decision to allow a massive sub-division at Mount Barker and Nairne and continuing discontent about the 77-hectare Seaford Heights development, a private member's bill seeking to protect Willunga Basin has already passed through the Legislative Council – with Liberal and crossbench support – and State Government has flagged its intention for legislation to protect McLaren Vale and the Barossa from a similar fate.

Two Adelaide University academics have raised the bar even further, proposing Agrarian Landscapes and UNESCO World Heritage Status for a region from Clare to the Willunga Basin...

In June last year, Prof. Young and the university's Professor of Agriculture and Food Policy, Randy Stringer, met with mayors and chief executives of the councils to discuss their proposal for the area – roughly following the

Heysen Trail – to be retained as working agricultural communities.

The favourable response from councils is only the first step in a process that may take 10 years and involve careful examination (and possible alteration) of boundaries, proposals for intensive housing sub-divisions and major development applications...

Prof. Young said the initial funding would finance a cost-benefit analysis. If agreement was reached, State and Federal Government would hopefully become part of the process in presenting the final submission.

LEGISLATED PROTECTION OF WILLUNGA BASIN AND SNIPPETS  
FROM FRIENDS OF WILLUNGA BASIN NEWSLETTER

Wayne's article "*Regreen the Range Update*" on this page refers to the Landcare group directing resources to the removal of woody weeds in remnant vegetation. This is **not** a choice that's been made by the group's committee. It's being dictated by the local NRM board who have control of where, and how, our money is utilised.

Whereas I fully appreciate the need for woody weed control, I see it as a job for the Animal and Plant Control Commission and "Weed Warriors."

*Weed Warriors, an innovative national programme that provides participants the opportunity to learn, hands-on about invasive pest plants, and to become part of the solution to the problem. Through a programme of interactive learning and hands-on experience, strengthened through unique partnerships developed between government and the community, Weed Warriors fosters an increased awareness of and participation in local weed issues.*

*Weed Warriors recognises children as the natural resource managers of tomorrow and challenges all Australians to develop a sense of connection to and responsibility for the natural landscape, thus empowering them to help shape their own future.*

The above text in italics was copied from this website: [weedwarriors.net.au](http://weedwarriors.net.au)

It would be fantastic if we could get local school children involved in this programme and let the Landcare group continue what it's been doing well for many years now... planting trees.

BRIAN.

All members, hillsface land owners and supporters are invited to drop in, perhaps during a visit to the Farmers' Market, to see a Regreen the Range display and the first copies of the

## **Regreen the Range Report 2007 to 2010**

**on Saturday, June 4th, 10a.m.- 2p.m.**

**in the Willunga Hub,**

**cnr. of St. Peters Terrace, Willunga**

LIGHT REFRESHMENTS WILL BE AVAILABLE FOR  
ALL ATTENDEES

# **Regreen the Range update**

What a wonderfully wet season we have had in the district, to see a tinge of green on the hillsface at the end of Feb. certainly is a rare event. The recently planted revegetation is loving this rain, especially at this time of year, a bit of moisture and lovely sunny days makes for an explosion in growth. Hopefully this coming season will be just as wet.

Over the past twelve months the Landcare group have focussed on removing woody weed threats from the remnant vegetation which is dotted across the spine of the escarpment. Some of this remnant vegetation is magnificent to walk through. Some patches of the stringy-bark forest contain trees that would be hundreds of years old while some patches have experienced fire in recent years and are recovering, with young stringy-bark seedlings forming a carpet underneath the blackened remains of mature trees. To see the forest burst into life after a major disturbance such as a fire allows you to see the natural re-generating processes that occur within the forest system.

This disturbance allows the re-generation of many native plants that may not have been present before the disturbance and only present as a seed source in the soil. The opening of the canopy, the clearing of the undergrowth and the heat of the fire all act to stimulate the seed, that may sit dormant in the soil for many years, to germinate and start the cycle all over again. This allows new opportunities for different native animals to exploit the new conditions provided by the cleared forest and allows for opportunistic and pioneering plants to flourish by not having to compete with well-established plants. It is envisioned that in the foreseeable future the Landcare group will direct the resources it receives into removing the woody weed threats from the remnant vegetation that is dotted across the escarpment.

Over the years the Landcare group has been able to expand the number of properties it has been able to undertake environmental works on due to new people moving into the district and purchasing land on the escarpment. This increase is still continuing with new people to the district recently purchasing on the escarpment contacting the Landcare group for help to remedy some of the environmental ills affecting their newly acquired property. This is a positive outcome for the group. Although the group has undertaken environmental works on a large number of properties across the hillsface, there are many properties the group have not worked on that require environmental work to be undertaken.

WAYNE LAWRENCE.

## **The story of Phosphorus:** *continued from Page 1*

(like wind, biomass or thermal energy), phosphorus has no substitute in food production.<sup>5</sup>

### **4. Growing food demand**

Demand for phosphorus is increasing globally, despite a downward trend in developed regions like Western Europe. This is due to an increasing per capita and overall demand for food in developing countries, from increasing population and global trends towards more meat- and dairy-based diets, which are significantly more P intensive.<sup>9,10</sup>

A balanced diet results in depletion of around 22.5kg/yr of phosphate rock (or 3.2kg/yr P) per person based on current practice. This is 50 times greater than the 1.2 g/d/person recommended daily intake of P.<sup>11</sup>

Achieving the Millennium Development Goal of eradicating hunger, we must change the way we source and use phosphorus in global food production. The African continent is simultaneously the world's largest producer of phosphate rock (almost 30% of the global share) and the continent with the largest deficit in food security.<sup>5,8</sup>

### **5. Energy intensive**

With growing concern about fossil fuel scarcity, we cannot afford to continue the energy intensive process of mining, processing and transporting phosphate rock and fertilizers across the globe. Phosphate rock is one of the most highly traded commodities in the world.

Around 30% of energy use in agriculture in the US is from fertilizer production and use.<sup>12</sup>

### **6. We've used up the good stuff**

The quality of phosphate rock is declining for two reasons: the concentration of P<sub>2</sub>O<sub>5</sub> in mined P rock is decreasing; and the concentration of associated heavy metals like Cadmium are increasing. The Cadmium content of phosphate rock can be very high. This is either considered a harmful concentration for application in agriculture, or, expensive and energy intensive to remove (maximum Cd concentrations for fertilizers exist in some regions, like Western Europe).<sup>10,13,14,15</sup>

Every tonne of P<sub>2</sub>O<sub>5</sub> in phosphoric acid generates 5 tonnes of phosphogypsum, a toxic by-product of phosphate rock mining. Radium levels are typically unacceptably high for re-use or disposal, and thus it must be stockpiled.<sup>16</sup>

### **7. Cheap fertilizer – a thing of the past**

The price of phosphate rock rose 700% in 14 months alone. While demand continues to increase, the cost of mining phosphate rock is increasing due to transport in addition to a decline in quality and greater expense of extraction, refinement and environmental management.<sup>13,15</sup>

In addition to increasing the demand and hence price of phosphate rock, biofuel demand is increasing ferti-

lizer runoff from short-rooted energy crops to pollute waterways.<sup>17,18</sup>

### **8. Recirculating human excreta**

Human excreta (urine and faeces) are renewable and readily available sources of phosphorus. Urine is essentially sterile and contains plant-available nutrients (P,N,K) in the correct ratio. Treatment and re-use is very simple and the World Health Organisation has published 'guidelines for the safe use of wastewater, excreta and greywater'.<sup>19,20,21</sup>

More than 50% of the world's population are now living in urban centres, and in the next 50 years 90% of the new population are expected to reside in urban slums. Urine is the largest single source of P emerging from human settlements.<sup>22,23</sup>

According to some studies in Sweden and Zimbabwe, the nutrients in one person's urine are sufficient to produce 50-100% of the food requirements for another person. Combined with other organic sources like manure and food waste, the phosphorus value in urine and faeces can essentially replace the demand for phosphate rock. In 2000, the global population produced 3 million tonnes of phosphorus from urine and faeces alone.<sup>21,24,25</sup>

Unlike phosphate rock, which only exists in a handful of countries' control, urine and faeces are available from any community or city, and hence can contribute to 'phosphorus sovereignty' and food security.<sup>8</sup>

In material flow terms, human excreta represents a readily available 'exchange pool' of phosphorus, before it is 'lost' to the hydrosphere typically as treated or untreated effluent discharged to rivers and oceans. If urine is re-used as a fertilizer, then less phosphorus (in urine) is entering waterways, reducing the potential to cause toxic algal blooms.<sup>11</sup>

Although preventing phosphorus point sources from entering water bodies is often necessary to prevent water pollution, removing high levels of phosphorus at the wastewater treatment plant is expensive and energy intensive. Capturing urine at source (at the toilet) can be much more energy efficient and cost-effective and does not contain heavy metals like Cadmium.<sup>11,26</sup>

The cost of ecological sanitation systems around the world could be offset by the commercial value of the phosphorus (and nitrogen) they yield in the future. Particularly in Africa where synthetic fertilizers typically cost 2-5 times more than in Europe. A community ecological sanitation toilet in Tamilnadu, India, now pays users, recognising the fertilizer value of their urine and faeces.<sup>27,28,29</sup> *This article copied from:* [phosphorusfutures.net/why-phosphorus](http://phosphorusfutures.net/why-phosphorus)

### **Key Resources**

Owing to lack of space I have not included the references. If anyone would like to check them out, I can email them to you. My email address is on the back page.

BRIAN

*Phillip Adams, on his regular ABC Radio programme, Late Night Live, recently spoke with two experts on the topic of carbon sequestration, reforesting the land and the future of our soil – extensively damaged through modern agriculture. This is an edited transcript of the discussion.*

## From dirt farming to green farming

**P.A.:** Tonight we're going to look at how important soils and trees are in sequestering carbon; that is, removing the older or historic emissions from the atmosphere, something that only sequestration can achieve. To do this, I'm joined by Christine Jones, an internationally renowned groundcover and soil ecologist who is also the founder of the Australian Soil Carbon Accreditation Scheme. On the blower from Melbourne is Andrew Grant, who is currently the CEO of CO<sub>2</sub> Group Ltd, the Australian market leader in the establishment and management of forest carbon sinks.

Christine, how much of Australia's agricultural land has been stuffed since European settlement?

**C.J.:** 99.9 per cent.

**P.A.:** As little as that?

**C.J.:** Yes, I've just been on a bit of a road tour down through New South Wales, Victoria, across to South Australia and back, so I've seen a significant proportion of Australia in the last couple of weeks, and I didn't see any land that wasn't degraded in that time. So it was a bit sad.

**P.A.:** Isn't the problem, in fact, accelerating because of topsoil erosion and the impact of declining yields and forced farming?

**C.J.:** We certainly have lost massive amounts of topsoil. Geologists would say that most areas of Australia have lost between 50cms and a metre of topsoil, which is a lot by anybody's standards, and unfortunately we still are losing soil. Some more fragile areas are losing it more quickly than others, but I'd say just about everywhere I've been where we've been out in a paddock and had a look, there's evidence of topsoil being lost right now.

**P.A.:** Are we still losing about seven tonnes for every tonne of wheat we produce?

**C.J.:** We're losing more; it's around 15 tonnes of topsoil.

**P.A.:** You're kidding!

**C.J.:** No, that's the average. There are places that are losing about 200 tonnes of topsoil for every tonne of wheat produced, now, this year.

**P.A.:** I'm so depressed I don't think I can go on with the programme.

**C.J.:** Oh, but there is a good side to the story.

**P.A.:** We're going to get to that in just a second, but I also want you to tell [the listeners] what's happened over the last 50 years in terms of the organic carbon content of our agricultural earth.

**C.J.:** Well, that's a sad story too, Phillip. That has been

declining. Most of our losses in carbon came originally from losses in topsoil, and now that we're down to farming in subsoil we're doing a pretty good job of removing any organic material that's in that as well.

And of course, because that's associated with life - life in the soil is carbon in the soil - our soils are losing their life and they no longer have the structure, and that means they don't have the function, so they're not functioning as we would expect soils to function.

**P.A.:** I like one of your lines - that our catchments are really 'drainments'. That's one of the impacts, isn't it?

**C.J.:** Yes, that has a lot to do with management; management of livestock and the way that we undertake our cropping. Most of these things can be fixed by fixing that space between our ears. It's our association with the land, how we relate to the land, whether we understand it, nurture it, care for it, how we manage it. That's where the solution is. Human creativity can overcome all of these issues.

**P.A.:** You've got a philosophy, which is called YGF, Yearlong Green Farming. Reveal all.

**C.J.:** Yearlong Green Farming... that term relates to the fact that the only way to get carbon dioxide to be fixed as carbon and to be transferred into the soil - if we want to build soil carbon - you need to have green leaves to do that.

Carbon needs a gas circulating in the atmosphere, but carbon can also be humus in the soil or it can be wood in a tree... but to turn that gas into something solid you need a plant with green leaves to do that. So Yearlong Green Farming just relates to finding a whole variety of ways that that could be done, to having green leaves present for as much of the year as possible. Obviously that's going to be related to rainfall, but you need to have plants that can respond to rain at any time that it does fall.

And one of the things that we're seeing in the southern part of Australia (Victoria, South Australia and the southern part of Western Australia) is that rainfall patterns are changing quite significantly, and there's more of that rain falling in summertime, so that people need to have plants there in summer that can respond to that rain.

**P.A.:** Christine, we had six or seven years of intractable drought at our place, and the only thing green that was left was cactus. You're telling me that there are plants that we can grow during drought even?

**C.J.:** Yes, there are, and it relates to the perenniality of those plants. Now, when you say seven years of drought; when people talk about drought they mean reduced rainfall... you still do get some rainfall - you just have to find ways of making effective use of every drop that falls...

### 100 years ahead

**P.A.:** Well, I've given up personal hygiene, what more can a bloke do? Andrew, let's move from perennial groundcover and talk about trees, because your company, CO<sub>2</sub> Australia, is into establishing and managing forest carbon sinks. And yet I remember President Reagan telling us that trees were the problem....

*Continued on Page 6*

## **Dirt Farming to Green Farming—** *Continued from Page 5*

**A.G.:** Important in the carbon cycle is understanding the role that trees play in removing carbon dioxide in the atmosphere, and when you look at the causes of climate change, one of the biggest contributors has been deforestation at a global level and, Australia has been sadly one of the leaders. So whilst our gaze focuses on the Amazon and the destruction of Amazonian rainforest, and the depletion of temperate forest around the world, since settlement we've cleared over 20 million to 22 million hectares of land in our continent. And not surprisingly, one of the solutions therefore, is reforestation, so as a business we've pioneered the commercial reforestation for the sole purpose of carbon sequestration.

**P.A.:** You're a fan of the Mallee eucalypt.

**A.G.:** Again, one of our biggest inland forests in Australia was the Mallee forest, widespread over 16 million hectares before conversion to agricultural use.

**P.A.:** Are we talking a particularly tough tree?

**A.G.:** There's 180 species of Mallee eucalypt, a very important group of eucalypts, and widespread, and what we've done is looked at which species of Mallee are most vigorous in their growth and respond to a variable rainfall. So, for example, in our plantings in New South Wales we had one year when we were establishing, the annual rainfall had dropped from 480 millimetres to 180 millimetres - so, lower than Alice Springs had in a year- and even with such low rainfall we still got excellent establishment and growth.

We're developing what I would describe as industrial scale plantings to partner with [major] companies in terms of managing their carbon emissions...

**P.A.:** What have I got to do to have you knocking on my door getting me to sign a contract at our place?

**A.G.:** You'd need to be in it for the long haul. Carbon trading is a funny kind of instrument, because there's a whole range of particular points of proof and legal documents that landholders have got to be comfortable with. It's not a short-term activity, and one of the most critical tests you've got to meet when you create one carbon credit through forestation, is that you have to demonstrate that that one tonne of carbon remains removed from the atmosphere for 100 years.

**P.A.:** I'd be willing to sign that, but I won't be around for most of that century.

**A.G.:** No, so in terms of scheme compliance you've got to demonstrate legal title to the carbon in the trees, and so landholders that we partner with are having to undertake agreements that go beyond 100 years, that once the trees are in the ground they're not removed.

### **Trees on farms**

**P.A.:** Andrew, what are some of the positive environmental benefits of integrating trees and farming systems?

**A.G.:** They're substantial, and the history of our business came about from many years of state and federal government research into dry land salinity, the curse that it

is - and it's particularly pronounced in Western Australia in the wheat belt region, but it's also an issue in Victoria and New South Wales.

After tens of millions of dollars of research, surprise, surprise, the solution was that we should plant the trees, at least in part, back into the landscape from which they were removed... If you don't have trees or perennial crops in the ground, what little rain you do get migrates across the landscape, leaches those salts from the soil and concentrates them in the lower lying areas.

Planting trees also improves the microclimate for crops. Often when a farmer is at harvest, a hot, dry wind can desiccate the crop and you can lose a very important proportion of your yield. It also provides shelter for livestock... I'm an ecologist by training, and it's surprising that in 2009 we're still coming to terms with the fact that Australian soils don't behave like northern hemisphere soils. Australian ecology is, strangely enough, a very young science, and we had to disprove through the '70s that a lot of those learnings didn't apply particularly well.

We've very ancient soils with unique soil/plant relationships. So even the Mallee, for example, can grow in very low fertility soils because it has this unique relationship with a [type of] fungus called mycorrhizal fungi - and that's a symbiotic relationship, so the fungus that's growing on the roots makes what little nutrient that's available in the soil available to the plants.

European crops can't access those nutrients. So learning to farm and maintain our catchments in a way that's harmonized with our natural systems is I still think, our biggest challenge.

### **Twin challenge**

**P.A.:** Andrew, back to forests. Under the kind of emissions trading scheme that the federal government seems to at least pretend to want to introduce, can your forest carbon sinks generate significant carbon credits?

**A.G.:** Yes... my observation is that we're fantastic at increasing our **emissions profile, we're great at debating the problem, but we're pretty lousy** about implementing large-scale solutions—and we don't have the luxury of time.

So some independent work done by Treasury, and also Professor Garnaut in his review\*\*, made the observation that reforestation in Australia can contribute potentially up to 10 percent of what the market would need and...

**P.A.:** 10 per cent? While delivering other advantages?

**A.G.:** Yes, and there's been some fantastic work done out of the US on what's called the climate wedge study, which looked at all known technological solutions in terms of meeting the international targets, and it's best summarized as we need all known solutions, plus some. So we need biochar, soil carbon, reforestation, renewable energy, energy efficiency and so forth...

We have the twin challenge of reducing our emissions profile as we go forward, and dealing with the consequences of historic emissions - scientists estimate that CO<sub>2</sub> has a lifecycle in the atmosphere of roughly 100 years.

So even if we were to go to totally renewable energy as of tomorrow and reduce our industrial emissions, we still, as an international community, have to deal with legacy emissions. So things like soil carbon and reforestation really have an additional attribute in that regard...

### Sequestering carbon in the soil

**P.A.:** Christine, back to you. How does the Australian Soil Carbon Accreditation System work?

**C.J.:** The system was set up to demonstrate that farmers could sequester carbon in their soil... The point is, though, that we can't sequester carbon in soil if we continue with the practices that we've used to lose it. So, in other words, the way we've conducted agriculture up until now has resulted in massive losses in soil carbon, and if we continue in those same techniques we will continue to lose carbon. You can't put it back the same way that you lost it.

So we have to have regenerative agriculture, we have to have innovative approaches to management, and that's where things like Yearlong Green come in. Most of Australia, as you've indicated yourself, is not Yearlong Green, but it was Yearlong Green. We know that 200 years ago it was, and we know that we can farm in ways that will reinstate that.

**P.A.:** I'd love to think that's true. You've put forward a proposal to the government, Christine, for a green agriculture demonstration scheme. Can you quickly talk about that?

**C.J.:** The Green Agriculture Stewardship Scheme would be to establish 100 sites around Australia, where we would demonstrate that it is possible to sequester carbon, and to increase the moisture-holding capacity of the soil, and to increase the biodiversity, the microbial diversity in that soil... to grow food and to make the land more productive.

That would be in 100 different locations in different regions, all of those in the temperate part of Australia, in the agricultural zone, and just using different techniques, farmers sort of being creative in the way that they went about it. They would be paid to do that; they would receive a stewardship payment for doing that, provided they met all of those criteria.

### References and more information

\* Edited for space reasons. The full programme was available for download at <http://www.abc.net.au/rn/latenightlive/stories/2009/2655330>. (May not be now).

\*\*The Garnaut Climate Change Review was an independent study conducted by economist Professor Ross Garnaut. It was commissioned by Australia's Commonwealth, State and Territory governments in 2007. For details go to [http://www.garnautreview.org.au/domino/Web Notes/Garnaut/garnautweb.nsf](http://www.garnautreview.org.au/domino/Web%20Notes/Garnaut/garnautweb.nsf)

• You can find more articles and details about the work of Christine Jones at <http://www.amazingcarbon.com/> and at <http://www.carboncoalition.com.au/>

• For more information on A.G.'s work, go to: <http://www.co2australia.com.au>



Supported by Adelaide & Mt. Lofty Ranges Natural Resources Management Board

18 High Street, Willunga. Phone: 8556 4188  
10 am – 3 pm, Mon.– Fri., Sat. 9.30 am – 1.30 pm.

COMING EVENT...

## "A Silent Forest"

Video Evening and Discussion  
(supper provided)

Thursday 19<sup>th</sup> May @ 7pm

Our Guest Speaker, Dr Phil Davies, Director of the Institute of Health & Environmental Research, will introduce the movie and be available for discussion afterwards.

**A Silent Forest** is a documentary about the largely unknown potential danger to human health, and the environmental health of our planet, posed by the planned introduction of genetically engineered trees.

Narrated by Dr. David Suzuki, the film lays out, in compelling detail, the dangers of open-air plantations of these untested man-made trees, and the added problem of intellectual property rights.

With the potential for cross contamination of private, national, and state forests with patented genes contained in the pollen of genetically engineered trees, **who would now own these infected trees?** Would a company like *Monsanto* be able to go into a national forest and harvest the infected trees because they contain their patented genes?

**This film is a wake-up call to the dangers of genetic engineering of trees, and the impact it could have on all of us.**

For bookings, call in, phone 8556 4188  
or email  
[willungaenviro@westnet.com.au](mailto:willungaenviro@westnet.com.au)



**Willunga Hillsface Landcare Group**

PO Box 215  
WILLUNGA SA 5172

Meeting dates vary, but are usually held on Mondays monthly at 4.30 p.m. in the Willunga Hub, cnr. St. Peters Terrace, Willunga. All members are welcome to attend these meetings.

**President:** John Campbell ..... 8556 2916  
**Chairperson:** Kate Parkin ..... 8556 2024  
**Treasurer:** Margaret Morris ..... 8556 2535  
**Secretary/Regreen the Range Manager:**  
Wayne Lawrence 0423 283 043  
Brian Visser..... 8556 4292  
**Committee members:**  
Ben Heyward ..... 8186 1607  
Paul McKenzie ..... 8556 7011  
Maarten Ryder .... 0409 696 360

**If you prefer to receive your copy in PDF format (via email) please let me know at this address: viza05@westnet.com.au.**



**Willunga Hillsface Landcare Group**

IF UNDELIVERABLE, PLEASE RETURN TO:  
PO Box 215  
WILLUNGA SA 5172

PRINT  
POST  
PP No. 12

POSTAGE  
PAID  
AUSTRALIA

Views expressed in this newsletter do not necessarily represent the views of WHLG

## WILLUNGA HILLSFACE LANDCARE GROUP

Willunga Environment Centre  
18 High Street, Willunga

### MEMBERSHIP FORM

Name: .....

Address: .....

Phone number: .....

Mobile: .....

email: .....

Property size/type: .....

Occupation: .....

Signature: .....

Date: .....

Joining or renewal fee (**DUE NOW**) ... \$11.00

**Please return this form together with your joining or renewal fee to:  
The Treasurer,  
Willunga Hillsface Landcare Group,  
P.O. Box 215, Willunga, S.A. 5172.**

Do you wish to continue receiving the "Green Challenger" (Y / N)