CLIMATE CHANGE: The Greatest Challenge to Livability – Nature's Solution

We are neither climate experts, nor Climate Change sceptics. We want to stress that we absolutely believe that human beings are massively contributing to current climate change effects, and we should reduce emissions by all means available, within sensible economic constraints.

Our thesis is simple and is shared by a growing number of scientists and farmers - that we can draw down the atmospheric CO_2 produced by fossil fuel use as well as historic emitted CO_2 by evoking Nature's Solution – PHOTOSYNTHESIS.

Our main points are:

- Climate has always changed on Earth and will continue to change, and we should be alert to emerging changes
- Fossil fuels will continue to be used until there are economic alternatives – indeed the International Energy Agency (IEA) predicts a 23% increase in fossil fuel use by 2035
- Contentiously perhaps, fossil fuel emissions are not the main cause of current climate change, albeit a contributor
- Rather, landscape and ocean degradation by human beings, is the main contributor
- Critically, Nature has a proven solution – PHOTOSYNTHESIS
- Finally, now that landscape and soil carbon credits are Kyoto compliant in Australia, we can unlock the current Carbon Farming Initiative (CFI) legislation to enable this proven solution, by engaging with landholders across the nation in an economic way)

To quote Leonardi da Vinci:

"Humans will never find an invention more beautiful, simple or more direct than nature, because in her inventions, nothing is lacking and nothing is excessive."

So we stress again that we are big supporters of renewable energy, lower emissions fossil fuel technologies, energy efficiency and recycling of all types, so long as they are economic.

But we need a rapid means to actually remove CO_2 from the atmosphere – if we want to do something about the predicted effects of this round of Climate Change – as reality dictates there will not be a reduction in the use of fossil fuels in our lifetime, and probably not in that of our children.

But there is hope we believe – and we'll explain why:-

Climate Change is, as we have said, not new.

Previous geological era of high CO_2 levels – whether caused by volcanic eruptions, solar activity, meteorite strikes, et al – have always been equilibrated by bursts of in-ground bacterial photosynthesis and ocean and land-based algae/plant photosynthesis, until CO_2 emissions were again balanced by CO_2 absorbed. Higher levels of CO_2 stimulated higher levels of vegetation growth, which involved higher levels of photosynthesis - thus absorbing the excess CO_2 and restoring the balance. This indeed explains the large peat, lignite, coal, oil and gas resources that we rely on.

For example, in Gippsland the young lignite deposits, laid down in the period 20 million to 50 million years ago, are over 600 metres deep - when conifer forests grew prolifically in Victoria - in much higher atmospheric CO_2 levels than now.

The problem over the last century or so is that humans have cleared so much land-based vegetation and seagrasses, and destroyed so much soil carbon by over-grazing and chemical farming (including deep ploughing and stubble burning), and resulting erosion, that the Earth is no longer able to equilibrate, in our time, the current increase in CO_2 caused by this landscape clearing and burning of fossil fuels. There is also a significant loss of capability to extract/fix nitrogen from the atmosphere and return this to the soil for healthy plant growth.

The consequential desertification caused mainly by over-grazing is now happening to two-thirds of the Earth's landscape

We wish to be very clear that although the Earth will of course recover given larger time scales, the human experiment is now at risk, unless we actively engage with and restore the photosynthetic processes that we naively destroyed. We now have the science to do this efficiently and in the time frame now required.

Indeed, the amount of carbon lost from soils (to atmosphere and oceans) due to human activity, since civilization began, and particularly over the last century or two, is estimated, using figures provided by the United Nations Environment Program (UNEP) and other sources, to be around 20,000 billion tonnes. This exceeds, by a factor of 40 to 50 times, the amount of carbon emitted into the atmosphere (as CO_2) from burning fossil fuels since the industrial revolution, being around 400 to 500 billion tonnes. We repeat, over 40 times as much carbon has been driven out of the landscape and agricultural soils by humans as has been emitted by the burning fossil fuels.

Put another way, if we stopped burning all fossil fuels tomorrow – which we all know we won't do – we would still be left with around 90% of the problem to solve and in a hurry! Simply put, we as a species must pass through this gate if we are to survive and flourish. We must meet our inter-generational responsibilities.

So today, with around 70% of the landscape cleared, the Earth's natural systems are only absorbing around 40% of the CO_2 being emitted by human activities each year – being around 30 billion tonnes per annum.

As well, bare soil is colder at dawn and hotter at midday. This changes the micro-climate, which over two-thirds of the Earth's landscapes, changes the macro-climate. In Australia, most of the southern third of the continent has been cleared of mallee scrub, leaving bare sandy paddocks in which you would not survive the heat of a summer's day – compared to the comparative cool in the remnant mallee scrub patches.

In Australia we are much better off due to our low-population and large land mass - so the net annual carbon stored by all Australian photosynthesis is about 20 times the amount of our annual emissions from combustion of fossil fuels.

So to fully offset all of our Australian emissions – including those caused by our exports or fossil fuels - we only need to increase photosynthesis by 5% across the Australian landscape. The good news is that with modern farming systems, using satellite technologies and modified farming and (biological) fertiliser systems – this is easily achievable.

So here is a great opportunity:-

Australian agricultural soils (which comprise around 500 million hectares and are two-thirds of the Australian continental area) have lost two-thirds to three-quarters of their soil carbon content since European settlement (reduced from 3% to 4% on average, down to around 1%), due to our vast clearing and then aggressive farming techniques (eg, continuous/deep tilling, chemical agronomy, mono-culture farming, burning-off, et al). Thus the equivalent of 150 billion to 200 billion tonnes of CO_2 sequestered in our soils has been lost, being around 300 years of Australia's current annual greenhouse gas (GHG) emissions (being around 0.6 billion tonnes CO_2 per annum).

So if we can now modify farming practices to get farm crops/plants/grasses/animals to sequester CO_2 into soils instead of destroying/removing soil carbon, this provides a natural, low-cost and powerful climate change solution, here and now.

A 0.1% increase in soil carbon, to a depth of only 6 inches, on just 10% of Australia's cropping and grazing lands each year, would offset all of Australia's current annual GHG emissions, including export-created emissions.

This is the basis of 70% of the Coalition's Climate Change Policy, which is aimed at incentivating farmers to increase their soil carbon – thus avoiding the need for the debilitating carbon tax.

And the Labor Government has also supported soil carbon bio-sequestration by passing the Carbon Farming Initiative (CFI) legislation and regulating landscape and soil carbon credits as Kyoto compliant. This, therefore, is a bipartisan politically supported solution to Climate Change.

There are estimates that Australian farmers, properly re-equipped and incentivated, could sequester 1 billion tonnes per annum of carbon for a century and more, or 6 times our current emissions from fossil fuels – so offsetting all our own emissions, plus those from all the coal and gas that Australia exports and will export in the future, and seriously starting to draw down additional 'legacy' CO_2

As we said, the good news is that there are proven ways to do this:

- First – by replanting trees and bushes on the marginal agricultural land – and on the ridges, valleys, fence-lines and salty areas of all farms.

- Second – and the most important is the introduction of holistic (planned rotational) grazing of livestock on the vast grasslands, which are mainly now desertifying and which comprise around two-thirds of the Earth's landscape.
  To explain – in nature there were large herds of animals (kept in herds by predators), which had to keep on the move to avoid denuding the grass-feed.
  So the answer today is to use livestock, bunched and moving, to mimic nature. They cover the soil with nutritious dung, urine and mulch, without baring the land of grass, enabling capture of rain-water and conversion of methane. This is 'Holistic Management', by planned rotational grazing – and it sequesters CO_2 via greater grass-roots growth into the soils, as well proven by Allan Savory - see link to TED talk: "How to Green the World's Deserts and Reverse Climate Change", by Allan Savory, within the excerpt below:-

  Jim Howell, a lifelong rancher and the CEO of a company called Grasslands LLC, says the conventional wisdom is ill-informed and misleading. More important, he has set out to disprove it. Grasslands owns four cattle ranches in South Dakota and Montana, where the company is monitoring the environmental impacts of its unconventional approach to ranching — called holistic management — and forging relationships with nonprofits like The Nature Conservancy and the Natural Resources Defense Council, hoping to turn them into allies. Last month, Howell's partner, mentor and friend, Allan Savory, who is a Zimbabwean farmer, politician and environmentalist, delivered a TED talk called "How to Green the World's Deserts and Reverse Climate Change" that rapidly attracted about half a million views. Their argument, in brief, is that traditional ranching methods can degrade land and threaten biodiversity but that, when managed well, cows can actually be restorative.

  We repeat the contentious assertion: Landscape degradation has caused and is causing more climate change than burning fossil fuels, and is destroying the land's ability to retain water and to feed the world's growing population.
  If, on the 5 billion hectares of grasslands, we could increase the soil carbon content by 1% to a depth of 2 feet, over say 10 to 20 years, an extra 54 tonnes of carbon per hectare (TC/ha) would be sequestered from the atmospheric CO_2, totaling 270 billion tonnes of carbon. This would lower the concentration of CO_2 in the atmosphere by the required 135 ppm (according to Allan Savory).

- Third – is to replace the use of chemical synthetic fertilisers (made from fossil fuel feedstock) - that destroy soil carbon and biology – by biological carbon-based fertilisers that cause plants to

photosynthesise much more and to grow deeper healthier roots, thus sequestering CO_2 into the soils.

By way of example, the good news for Victoria is that we have proven that using lignite-derived fertiliser we can catalyse farm crops to grow much greater root mass that deposits a minimum of 15 tonnes of CO_2 per hectare per annum in the soils (and potentially up to 37 tonnes of CO_2 per hectare per annum). It also reduces the source of chemical-nutrient run-off that is polluting most rivers, estuaries and lakes (including the iconic Gippsland Lakes and the Great Barrier Reef). These more productive and healthier soils lead to healthier food, resulting in less risk of allergies and cancers. Indeed, improved nutrition will greatly reduce Australia's future health budgets for diseases such as obesity, cardiovascular disease, diabetes, stress, osteoporosis, goiter and a myriad array of downstream medical conditions, not to mention the wellbeing of our community at large.

So a mere 4 million hectares of farmlands so fertilised and farmed will offset all of the Latrobe Valley's current brown coal electricity-generation emissions (ie, around 60 million tonnes CO_2 per annum), based on 15 tonnes CO_2 per hectare per annum bio-sequestration. This has been publicly acknowledged by Australian Parliamentarian, Simon Crean who visited some of these demonstration biological farming systems last year.

As we have said, there are estimates that Australian farmers, properly re-equipped and incentivised, could sequester 1 billion tonnes per annum of carbon for a century and more - or 6 times our current emissions from fossil fuels.

Soil carbon increases will be self-funding, by nature, due to the lower farm input costs and the resultant agriculture productivity gains from this form of land management.

In conclusion: There are natural solutions available now to mitigate climate change effects if only we recognise the opportunity and devise education and incentivisation systems for Australia's 100,000 or so farmers - who are the custodians, along with indigenous Australians, of over two-thirds of the Australian landscape. These results will be applicable globally.

What surprises us most, however, is that in the face of so much concern about the impacts of rising CO_2 levels in the atmosphere, we continue to ignore NATURE's proven systems.

Naturally our thesis appears to threaten the full supply chain of the chemical agri-business sector from raw suppliers through to agronomists. Science will resolve the arguments and we invite the agri-supply chain and those involved to review the science. Simply put, does one's system grow organic soil carbon or destroy it?

If convinced, we suggest the current agri-supply chain engage quickly with the established and proven supply chains of biological fertiliser providers who are ready and able to gear up to the required scale and would welcome licensing their hard earned sciences. This revolution in landscape management is an exciting emerging business, environmental and societal opportunity for all, not a threat.

Finally, the 'green activists' and others who would argue against soil carbon must be clear that they will be judged by future generations to have failed in their very namesake, should they fail to back the immediate and efficient operationalisation of the CFI legislation. We invite them into the tent.

The opportunity is that we can draw-down CO_2 from the atmosphere by regenerating the landscape and improving the carbon content, quality, productivity and health of agricultural soils over the next decades and beyond – while we make the necessary and orderly transition to new, economic, low-emissions energy sources.

By applying productivity enhancing land management techniques, we can easily correct the rapidly increasing carbon imbalance in our atmosphere by invoking Nature's Solution – PHOTOSYNTHESIS.

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About the Author:

From 2006 Dr John White served as Chief Executive Officer of VCR, prior to merging the company with Ignite Energy to form Ignite Energy Resources (IER). IER has integrated leading-edge low-emissions technologies to convert massive surface-minable lignite deposits in Gippsland, Victoria into high-value energy and biological-fertiliser products for domestic use and export. IER is in a joint venture with Esso to explore for natural gas in the deeper lignite seams in south east Gippsland.

Until 2009, John was the Chairman of Global Renewables which he formed in 2000 to pursue greenhouse gas reduction opportunities by providing solutions for municipal solid waste (MSW) recycling. Global Renewables integrated technologies to develop the UR-3R (Urban Resources – Recovery, Reuse and Recycling) Process, with the first UR-3R facility, commissioned in 2005, processing around 200,000 tonnes per annum (tpa) of MSW waste at Eastern Creek in Sydney, NSW. In September 2005, Global Renewables was selected to design, build, own and operate the Lancashire Waste Partnership PFI project in the United Kingdom. With total revenue of around $6 billion, to process 765,000 tpa of municipal solid waste over 25 years, it is one of the largest waste recycling projects in the world.

From 1978 to 1983 John had extensive involvement with Woodside Petroleum Ltd's North West Shelf offshore domestic gas and LNG development, as Senior Engineer for the design of the North Rankin A offshore platform and Resident Engineer for its construction and installation. Then, as General Manager of Eglo Engineering Ltd, John helped instigate and managed the tender for the RAN Collins Class Submarine Project, and subsequently headed the teams that successfully tendered for the purchase of Williamstown Naval Dockyard from the Australian Government in 1987, as well as the completion of the A$1 billion Australian Frigate Project and the A$5 billion ANZAC Frigate Project. John was Chief Executive Officer of Transfield Defence Systems (1988 to 1996), Global Chief Executive Officer of the recycling and packaging group, Visy Industries Australia Pty Ltd (1996 to 1998), Managing Director of the building products and distribution group, Siddons Ramset Ltd (1998 to 2000), and Chief Executive Officer and Chairman of Global Renewables Pty Ltd (2000 to 2006).

John has been Director of a number of publicly listed Australian companies, was Chairman of the Australian Government's Uranium Industry Framework (2006 to 2007), a member of the Australian Government's Defence Procurement Board (1999 to 2003 and 2004 to 2008) and is currently a Director of the Defence SA Advisory Board.