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Fight climate change by watching grass grow

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We've all heard the doom and gloom predictions for life on a warmer planet - food shortages, increases in droughts, floods and disease.

Some argue the advent of an Australian Carbon Pollution Reduction Scheme offers an "out of the environmental frying pan into the economic fire" solution resulting in soaring fuel, food and energy prices and an instant $10 billion to $15b hit to our already shaky economy.

But what if all of our environmental and economical problems arising from climate change could be solved by simply watching grass grow? A growing number of farmers around Australia are now claiming this as a real possibility.

- **Revolution in agriculture needed to keep feeding the world**
- **Improving soil structure can lead to higher yields and more sustainable production**
- **Increasing carbon in soil by 0.5pc over 2pc of Australian farm land could sequester all of Australia's national carbon dioxide emissions**

Last year the Australian Business Council of Sustainable Energy claimed that for the Rudd Government to fulfil its commitments to the United Nations, Australia would need to reduce its greenhouse gas emissions by 33 per cent below 2000 levels in the next 12 years.

It estimated this reduction would cost governments, producers, exporters and consumers at least five per cent of Australian GDP, or $50 billion a year.

More recently, the World Bank's vice president for sustainable development, Katherine Sierra, addressed an audience of technological scientists and engineers in Canberra appealing for renewed scientific research into genetic mapping of key crops, medicinal herbs and soil and water management.

Her sentiment was echoed by CSIRO Director of the Agricultural Sustainability Initiative, Dr Brian Keating, who recently said Australia would need "a revolution" in agricultural productivity in coming decades to meet the dual challenges presented by a changing climate and increasing population, particularly in the efficient use of land and water and nutrient and energy resources.

This message has hardly caused shockwaves among farmers, one group of Australians well accustomed to adapting and meeting the challenges of climate changes and land and water management.

Farmers are now being seen as the front runners in the global race against time and nature. And there is a growing consensus among these "revolutionaries" that governments and scientists need to get their heads out of the sand and into the soil.

Agricultural scientist, Dr Christine Jones, claimed that increasing the amount of carbon in soil by 0.5pc over just two per cent of Australian farm land would sequester all of Australia's national carbon dioxide emissions.

However, the carbon sequestration capability of soil and of the agriculture industry in general, has been largely unexplored by the scientific community.

Consequently, Dr Jones's findings have received a varied response from government, industry, and particularly from scientists.

The spring issue of the CSIRO's plant industry newsletter claimed: "Not only is it difficult to increase the amount of carbon stored in cropped soils - even with no-till and when large amounts of stubble are retained - it is also very difficult to quantify any change in the amount of carbon stored, a necessary requirement under the carbon-trading rules of the Kyoto Protocol."

Not surprisingly, Dr Jones is at odds with the CSIRO. With financial backing from a Singaporean philanthropist, Dr Jones has established the Australian Soil Carbon Accreditation Scheme.

The scheme is run on a voluntary basis and pays farmers $25 per tonne of carbon stored using the land management strategies developed by Dr Jones and a group of farmers in central NSW.

"The world's soil holds around three times as much carbon as the atmosphere and over four times as much carbon as the vegetation," Dr Jones said.

"Building soil carbon requires only green plants and soil microbes, and a significant number of grain growers are already doing this.

"We established the scheme to prove carbon can be stored in a stable form, for long periods of time, to prove it is easy to increase and to prove it can be measured."

The CSIRO newsletter also claimed in order to store carbon stably in soil, "you need considerable amounts of nitrogen, phosphorus and sulfur in addition to that needed for crops."

Dr Jones said these claims were misleading and pointed to work she had done investigating the possibilities of planting broadacre crops into perennial grasses as evidence.

The grasses and crops absorbed carbon using sunlight during the photosynthesis process and served as a living host of mycorrhizal fungi. The fungi then took the carbon from the roots of the grass and crops and store it in humus, a gel-like substance, below the soil surface.

Dr Jones said nutrients such as nitrogen, phosphorus, sulfur and zinc are continuously recycled through the dynamic biological soil, microbial, plant ecosystem.

What's more, Dr Jones said, once the biological system was established it would actually replace the need for synthetic fertilisers, costly to both farmers' tight budgets and the environment.

And, she claimed, the positives didn’t stop there.

Dr Jones said storing carbon in humus improved soil structure, improved plant nutrition, increased soil water-holding capacity, improved production and effectively ameliorated the symptoms of dry land salinity.

Furthermore, she said the practice was not necessarily restricted to cropping; it could also be adopted by graziers or incorporated into mixed farming.

"A farmer could plant crops in the grasses for half of the year and graze them during the other," she said.
So, what's the catch?

The fungi, which store the carbon and provide the nutrients to the plants and grasses, are inhibited by bare soil, pesticides, phosphorus fertiliser and intensive tillage.

The upside was that farmers were increasingly moving to low-till or no till farming to save on fuel costs, so the only difference in land management would be having perennial grasses covering crops year-round to insure the fungi’s survival and life in the soil.

AgForce president, John Cotter, supported the research done by Dr Jones and her colleagues and said the lack of verifiable agricultural science had long been a hindrance to producers.

"That direction is exactly where we need to be going," Mr Cotter said of Dr Jones's work.

"The agricultural industry is one of the leading up-takers of technology in Australia. We're leading the way in technology and we'll lead the way with this (climate change).

"At the moment there's adequate opportunities to measure our emissions but very little to measure our sequestration and the cycle in which our whole industry operates."