

AUSTRALIAN FARMERS CAN REVERSE THE GLOBAL
EFFECTS OF THE INDUSTRIAL REVOLUTION

CARBON NATION

BY COLIN TAYLOR

FARMERS hoping to cash in on the Federal Government's promise to pay them for carbon capture may like to hear about a new pathway that potentially makes the process faster and easier.

The Yeomans Carbon Still, the brainchild of Queensland inventor Allan Yeomans, is designed to make more practical the measuring of soil carbon content and so buttress the role farming can play in mitigating the effects of climate change.

Allan is the second son of the late P.A. Yeomans, pioneer of the Yeomans Plow and the Keyline system of regenerative agriculture, set out in his 1954 book, *The Keyline Plan*.

Along with Allan, P.A. Yeomans introduced tined implements into Australia, later developing their own, and forged concepts now used by farmers around the world, undergirding the later development of the principles of permaculture.

Allan, 87, still heads Yeomans Plow, now based at Arundel on the Gold Coast, and continues his passionate advocacy for the concept he first proposed in 1989 of the sequestration of atmospheric carbon dioxide into soil by the enhancement of soil fertility.

"I've been thinking about climate change for more than 30 years and I knew it was possible to take carbon out of the air and use soil to do it," he said.

"There's already too much carbon dioxide in the air,

but farmers, through the ordinary process of farming, can convert it into humus and store it in the soil sink.

"At present, there's no adopted standard in the world for measuring organic carbon in soils and so, at the moment, we don't have a system in this country where farmers can easily be paid for that sequestration.

"We simply want to measure how much increase there has been in organic carbon in the form of humus and dead material in a way that's easy and practical to measure with believable results."

The Yeomans Carbon Still – a machine the size of an office desk – takes a 2kg sample of soil using an in-field kit comprising a powered four-inch or 10cm auger, powered mixer and sampling sieves.

In a two-hour process, the sample is weighed and dried, then heated to more than 500C – the temperature at which carbon and other organic matter will burn off.

It's then cooled down, weighed and the difference in weight is the amount of carbon compounds that were there – a process known as Loss on Ignition.

Allan said the machine was easy to use, easily set up in a farm shed and required only a power supply and access to a basic service station-sized air compressor.

CONTINUED PAGE 12





WHAT IS CARBON?

CARBON is everywhere — a chemical element present in diamonds, graphite and petroleum, charcoal and plastics — as well as carbon-based molecules which are the basic building blocks of humans, animals, plants, trees and soils. Humans are about 20 per cent carbon.

Soil organic carbon — the measurable carbon component of soil organic matter — is the basis of soil fertility, releasing nutrients for plant growth, promoting the structure, biological and physical health of soil and acting as a buffer against harmful substances.

Put simply, SOC is made up of partly decomposed plant and animal materials, microbial organisms, humus and charcoal — excluding fresh materials such as fallen leaves, stubble or dung. The world's soils hold about twice the amount of carbon found in the atmosphere and in vegetation. The soil, however, is the largest carbon sink over which we have any control and farmers are its stewards.

Humans' use of fossil fuels, clearing of vegetation and soil disturbance have all added carbon dioxide to the atmosphere, resulting in a 37 per cent increase since 1750.

Storing more carbon in the soil as organic carbon reduces the amount in the atmosphere — a process known as soil carbon sequestration. Soils can store carbon, but how much (and for how long) varies, depending on soil texture, farming activity, soil moisture and temperature and climatic conditions.

Soil carbon can be increased through optimising livestock rotations, retaining stubble, growing more pastures, multi-species pasture cropping and returning manure and recycled organic materials to the land.

LOW INPUT FOR HIGH RETURNS

ROBERT Quirk produces about 9000 tonnes of sugar cane annually on his 100ha farm at Duranbah, in the Tweed Valley of northern NSW.

Named National Carbon Cocky of the Year in 2014, Robert says his farm's high organic carbon levels meant his inputs remained low, with fertiliser use falling 40 per cent.

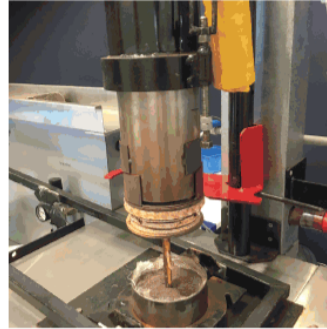
"In the 1990s, I invested in laser-levelling to improve drainage, performed regular liming and adopted several agronomic practices to improve organic matter input and soil quality," Robert says.

"Those changes left my property more sustainable, with cheaper cost of production and a 50 per cent lift in output, with regular returns of 93 tonnes of sugarcane per hectare compared to a global rain-fed average of around 38 tonnes.

"I harvest without burning, retain all residue and spray with 5kg of urea in 300 litres of water per hectare immediately after harvest to promote fungi.

"I use minimum-tillage practices, legume break crops to fix nitrogen and have minimised the application of acid-forming fertilisers, such as urea, by soil testing and only adding replacement quantities of nitrogen.

"My soils have a surface pH of nearly six and organic carbon content has risen from under 2 per cent in 1990 to over 5 per cent — conservatively, that's an extra 4800 tonnes of carbon stored on-farm since 1990."



FROM PAGE 10

"The current tests now date back 100 years, when they were measuring calcium levels or magnesium — all done in laboratories with equipment starting at around \$120,000 — but they only test tiny samples of maybe half a gram to two grams," he says.

"It's hard to believe and accept that such tiny samples could give accurate representations of the carbon content of a 100ha or 1000ha

"If all the farmland in the world lifted its soil carbon content by just 1-2 per cent, it would be enough to pull back out of the air all the excess carbon dioxide released since the Industrial Revolution.

"Australia, China and the US have by far the most land available for carbon capture, so our influence on global warming is potentially more significant than any European country or even the whole of Europe put together.

"It's enormous, but it's rarely talked about."

“

If all the farmland in the world lifted its soil carbon content by just 1-2 per cent, it would be enough to pull back all the excess carbon dioxide released since the Industrial Revolution

”

paddock — even one of 10ha.

"This machine now sells for around \$10,000 and two have already been sold and delivered to universities in Europe."

Allan says patents have been granted in Australia, the US and UK, with applications current in other countries.

"However, at this stage in Australia, farmers and laboratories won't buy it until it goes through the official approval process done by the laboratories themselves," he says.

Carbon Farmers of Australia is a company operating as a licensed carbon farming project developer under the Federal Government's Emissions Reduction Fund — active across Australia as well as agroforestry work in Nepal.

The organisation initiated the first formal training program on soil carbon in 2008 and wrote and published the first *Carbon Farming Handbook* the following year.

"We have about 200,000ha under different projects with different farmers," said director



Louisa Kiely, a wool grower with husband Michael in the Wellington district of NSW.

“Basically, we assist farmers through designated methods, such as improved grazing management, cover crops, pasture cropping and compost, to be able to store carbon in trees and vegetation, which store it in their structures and take it down into the soil.

“Allan has done an amazing job with his Carbon Still, but it can’t be used with the current soil carbon method, which is very specific in its requirements.

“This is a government method by which it is approved that you can test your soils in a certain way – depth, breadth, how you mix the sample, how you decide where to sample are all specified.”

Louisa says that material is then sent to a National Association of Testing Authorities-approved lab and comes back with a baseline

measurement of tonnes per hectare of soil carbon.

“You then do an activity to increase soil carbon and test again a year or two later,” she says.

“If you have shown an increase over that time, there are calculations which allow you to trade part of that increase under the government program for what’s called an Australian carbon credit unit.

“That’s the process known as carbon-offsetting.

“Not all farmers want to go down this path because it’s so heavily regulated, so if someone wanted they could enter into a voluntary agreement under a new process called carbon-insetting.”

“Any farmers who wanted to use the Yeomans system could do the same thing – they could measure, run an activity, measure

Accurate: Allan Yeomans (inset, top left) with his carbon still, which takes a 2kg soil sample that is heated to more than 500C, cooled down to determine the amount of carbon compounds that were originally in it.

again, then make a claim on their soil carbon increase.”

Louisa says farmers can then put that to the market and a company that wants an easier way to make a claim can buy direct from those projects in order to win carbon credits.

“However, that route is not government-regulated, nor government-approved, so you’d have to be extremely careful to ensure the evidence for your claim was rock-solid.

“What Allan needs now, in my opinion, is to build the team of supporters around him, gain his necessary approvals and see his system get under way on a couple of farms.

“He’s not that far away.”

The ninth National Carbon Farming Conference and Expo will be held in Albury, NSW, from August 5 to 8.

DETAILS:
CARBONFARMINGCONFERENCE.COM.AU