

Policies using carbon capture and storage in soil are impractical and costly say experts

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(Phys.org) —Although recommended in the Coalition's Direct Action Plan and the Carbon Farming Initiative, offsetting greenhouse gas emissions by increasing carbon storage in Australian agricultural soils is not likely to be effective, say experts from the University of Melbourne.

A team of researchers from the Melbourne School of Land and Environment have analysed 56 papers to understand the effects of agricultural management practices on soil carbon sequestration in Australia.

Study author Professor Rick Roush, Dean of the Melbourne School of Land and Environment, said the potential for increased [carbon storage](#) in Australian [agricultural soils](#) was technically and economically very limited.

The analysis is published this week in Nature's *Scientific Reports* and authored by University of Melbourne researchers Professor Roush, Professor Deli Chen, Shu Kee (Raymond) Lam and Professor Arvin Mosier, also based at the University of Florida.

"We reviewed and analysed a large group of studies including 172 direct comparisons for the effects of [conservation tillage](#), 116 for residue retention, 83 for the use of pasture and 64 for increased application of [nitrogen fertilizer](#)," Professor Roush said.

Using the findings of these previous studies, the team then ran calculations based on the 100 million hectares of managed cropland and modified pasture in Australia, assuming 100 percent take-up of the improved practices, and without their potential for increased emissions of methane from [grazing animals](#) and nitrous oxide from additional nitrogen fertilizer.

"Our analysis showed that these strategies would result in only 53.3 million tonnes of CO₂ equivalent sequestered in soil and would therefore not meet the 85 million tonnes targeted in the Coalition's Direct Action Plan," Professor Roush said.

Professor Chen added that even at the relatively high [carbon price](#) of

\$23/tonne, all practical soil management practices lost at least \$3 per hectare per year. Under normal cropping practices, farmers would need about \$36 per hectare to break even on carbon payments. This, along with the restrictions that the carbon must remain sequestered 100 years, limits the viability of the Carbon Farming Initiative.

"Increasing soil carbon is good for fertility and productivity of soils, so has long been a goal of cropping, even though the financial benefits are hard to calculate," Professor Chen said.

"Even when nitrogen fertilizer was used to increase crop growth and subsequent soil carbon, the costs of the extra fertilizer use generated a financial loss across all systems even assuming that you can keep the carbon in the ground despite drought, and changing land ownership and practices."

More information: [www.nature.com/srep/2013/13071 ...
/full/srep02179.html](http://www.nature.com/srep/2013/13071.../full/srep02179.html)

Provided by University of Melbourne

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