Measuring carbon in soil takes a leap forward

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A breakthrough in the agricultural sector's ability to measure soil carbon storage could provide a major boost to their participation in a carbon economy.

Researchers at the Soil Security Laboratory at the University of Sydney have developed an instrument, the soil carbon bench, which can determine carbon levels from much larger samples, with greater accuracy and lower cost, than any existing technology.

The soil carbon bench (SCB) and its first results were presented this week at the International Union of Soil Sciences Global Soil Carbon Workshop, held at the University of Wisconsin, Madison. The Faculty of Agriculture and Environment research team consists of Robert Pallasser, Associate Professor Budiman Minasny and Professor Alex McBratney.

"The agricultural sector in Australia has the potential to capture and store carbon emissions in soil. However there is no guarantee that the industry can benefit from the offsets in the current and future carbon economy because until now there has not been a good and efficient way of measuring soil carbon storage with statistical confidence," said Professor McBratney.

PhD researcher Robert Pallasser has been developing an instrument to extract and accurately quantify soil from cores up to a metre in length, which yield samples of 300 to 500 grams of soil for analysis after initial drying.

"This is a new concept for measuring carbon stocks where it can be extracted from whole soil cores and analysed immediately," said Associate Professor Minasny.

"This is a great advantage over the current method that relies on 'point analyses' of a highly variable quality based on 0.5 gram amounts of soil at a time because current instruments are limited to these miniscule amounts.

The current methods of soil carbon analysis are very labour intensive. To ensure a representative sample with elements from all parts of the core, they have to be crushed, homogenised and carefully sampled again. The new method can get an accurate representation of the variability of carbon in soil over space and depth without this costly process.

Capturing carbon in soil or sequestration has been held back by the absence of an easy to use and reliable method. Sequestration promises major environmental benefits from capturing carbon which also, by increasing the organic matter in the soil, improves productivity and resistance to land degradation.

"To pursue sequestration and the participation of farmers in a carbon market successfully we need cost-effective, accurate measurements of carbon in soil so the potential for this technology is exciting," said Robert Pallasser.

The researchers plan to continue field testing the SCB while working on automating its components.

Provided by University of Sydney

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