Factsheet: Soil Carbon

Carbon in the soil exists in different forms: soil organic matter originates from biological material such as leaves, roots, microbes, fungi and animals, and plays an essential role in soil structure and its ability to hold water and air. It is a valuable form of carbon and is readily increased; however, it is also the least stable form of soil carbon and breaks down easily.

Soil organic carbon (SOC) is the carbon in the soil organic matter – specialist laboratories measure and report on SOC. SOC is an indicator of healthy, productive soils.

What is soil carbon project?

The Australian ACCU Scheme's carbon farming method: *Estimation of soil organic carbon sequestration using measurement and models* supports farmers adopt better land management practices that can increase the amount of carbon stored in their soil, which helps to boost farm productivity, improve soil health and increase drought resilience.

These projects can also be issued with Australian carbon credit units (ACCUs), a tradeable financial asset: 1 ACCU can be issued for every tonne of extra carbon that is stored.

An increase in SOC may lead to the landowner being issued with ACCUs. This carbon then has a permanence period, which means that level of carbon must be maintained over the long term (25 years), not year by year.

Project activities

Soil carbon projects use practices like cover cropping, composting, and reduced tillage to enhance soil structure, fertility, and microbial activity which can improve soil health and help prevent erosion. Over time, improved soil health can lead to better yields and reduced input costs and improve productivity. These "co-benefits" - positive benefits from a project - add value to the carbon and offer other benefits to the landowner and the land.

To be eligible under the ACCU Scheme, projects must introduce one or more new activities or for the activities to be materially different to what was done before.

Soil carbon farming projects are registered on land that was used for pasture, cropping, horticulture, bare fallow, or a combination of these for the previous 5 years.

Eligible activities include:

- applying nutrients to the soil in the form of a synthetic or non-synthetic fertiliser to address a material deficiency, e.g. applying compost or manure.
- re-establishing or rejuvenating a pasture by seeding or pasture cropping where there was previously no or limited pasture, such as on cropland or bare fallow.
- altering the stocking rate, duration or intensity of grazing to promote soil vegetation cover.
- retaining crop stubble.
- modifying landscape or landform features to remediate land. For example, erosion control, surface water management, drainage control, or alleviating soil compaction. Practices may include controlled traffic farming, deep ripping and water ponding.
- using mechanical means to add or redistribute soil through the soil profile.
- planting legume species in cropping or pasture systems.
- use of cover crops to promote soil vegetation cover and/or improve soil health.

Many farmers do some of these activities already. If you are, you do not need to stop - just add at least one new or materially different activity from the list to what you are already doing.

It is important to note that undertaking eligible management activities may not result in increased soil carbon as it depends on things like the baseline level and the soil types.

Land management strategy

To register as soil carbon project, a Land Management Strategy (LMS) is needed. The LMS encourages farmers to consider how they will achieve soil carbon outcomes in a way that does not conflict with broader business objectives, and ensures that interactions between changing activities, climate, environment and whole-of-system outcomes are considered.

The LMS is prepared by someone with appropriate knowledge of agronomy, plant nutrition and soil carbon, and experience in providing agricultural production advice, and signed off by a qualified independent person.

The LMS identifies at least one new or materially different eligible activity to be introduced, the soil types, rainfall zone, the other farm activities and the reporting and monitoring activities that will demonstrate the new management activities were conducted to the extent necessary.

Soil sampling

The ACCU Scheme's soil carbon method allows farmers to measure the change in SOC by:

- Measurement Only: Soil samples are tested to see how much SOC is present; or
- Measurement + Models: Soil samples are combined with computer models to estimate SOC levels across larger areas.

Baseline sampling is undertaken to measure SOC in carbon estimation areas in the first reporting period for new projects, or within 18 months of land added to an existing project.

The Measure + Model approach requires project sampling rounds occur every 10 years and estimation events occur every 5 years for the duration of the crediting period (25 years).

An independent person collects soil core samples and measures SOC using laboratory measurements or laboratory calibrated in-field sensors.

A consistent soil carbon estimation technology (for example, combustion or sensors) must be used in each carbon estimation area and for each sampling round.

Sample analysis

Analysis of soil organic carbon is undertaken by a laboratory certified by the Australasian Soil and Plant Analysis Council (ASPAC) for organic carbon analysis by dry combustion and accredited by the National Association of Testing Authorities (NATA).

DPIRD recommends using a WA-based laboratory which has the option for Colwell P, Phosphorus Buffering Index (PBI) and Nitrogen analyses. Other soil analyses such as EM38 assessments for electrical conductivity (EC), cation exchange capacity (CEC), pH and soil respiration support the improved understanding of the "soil's story" and the impact of the land management changes.

For more information

- Clean Energy Regulator's website describes the method and what is expected.
- DPIRD's Service Provider Directory has experts in soil carbon projects
- Contact carbonfarming@dpid.wa.gov.au.