Soil Carbon Guide

Australian Government - Soil Carbon 2021 Method

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Prepared By:

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Abbreviations:

ACCU – Australian Carbon Credit Unit

ANREU – Australian National Registry of Emissions Units

CER – Clean Energy Regulator

CEA – Carbon Estimation Area

ERF – Emissions Reduction Fund

GIS – Geographic Information System

LMS – Land Management Strategy

SOC – Soil Organic Carbon

CEA – Carbon Estimation Area

KEY TERMS

Key terms are referenced throughout the document within these text boxes.

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Introduction to Soil Carbon

We're here to simplify the process of understanding and managing a soil carbon project. This section will introduce you to the basics of a soil carbon project as foundational knowledge before you get started with your own project.

What is a soil carbon project?

Participating in a soil carbon project involves managing your land in a way that increases the amount of carbon stored in your soil. By building these soil carbon stocks, you are therefore removing it from the atmosphere. This removal - and resulting increase in your soil carbon stocks - earns you carbon credits.

There are several activities you can undertake to encourage soil carbon increases. A soil carbon project will require you to implement one or more new or materially different land management activities. These can include:

- Application of nutrients or minerals to address a material deficiency in the soil (e.g., fertiliser)
- Undertaking new irrigation
- Re-establishing or rejuvenating pasture
- Changing from a cropping or bare fallow to a pasture-based system
- Improving grazing management
- Reducing tillage or retaining stubble in cropping systems
- Mechanical landscape modifications (such as water capture, clay delving or compaction intervention)
- Integration of cover crops or legumes into rotations

With help from a trusted farm advisor, you can select which combination of these activities are best suited to your farm operation.

If you are already implementing one of these activities, you do not have to stop that activity. You simply need to implement additional activities that are new or materially different. For an extensive list of eligible activities see **Appendix 1.**

Determining your 'baseline'

To be awarded with carbon credits, before you start these new activities you first need to determine the starting point for:

1. your farms operational carbon emissions, and
2. how much carbon is already stored in your soil.

From an emission perspective, you need to collate farm records over the five years prior to your project (or make conservative assumptions). This will be used to calculate your 'typical' on-farm emissions from livestock, machinery, fertiliser etc. Changes in your farms' operational emissions are taken into account when they calculate your carbon credits and will be audited throughout the project.

For the soil carbon side of things, you will need to hire an independent third-party contractor to take soil core samples to see exactly how much soil organic carbon (SOC) is within your soils. This is called baseline sampling and provides a starting point for your soil carbon project.

Establishing your increase

Once you've established your baseline and your project has been approved by the Clean Energy Regulator (CER), you can start undertaking your new management practices. After a sufficient period to allow for carbon stocks to increase (usually 3-5 years), a contractor will return to take the next set of soil samples. They will also recalculate your farms' operational on-farm carbon emissions. By comparing the latest sample set to the baseline sample set, you can establish your total SOC change from the baseline level. This is called your '*Net Carbon abatement'* and is what you will receive carbon credits for.

Basically, you get rewarded for gains in SOC, less any increases in your on-farm emissions.

The figure below illustrates how your carbon increase is measured.

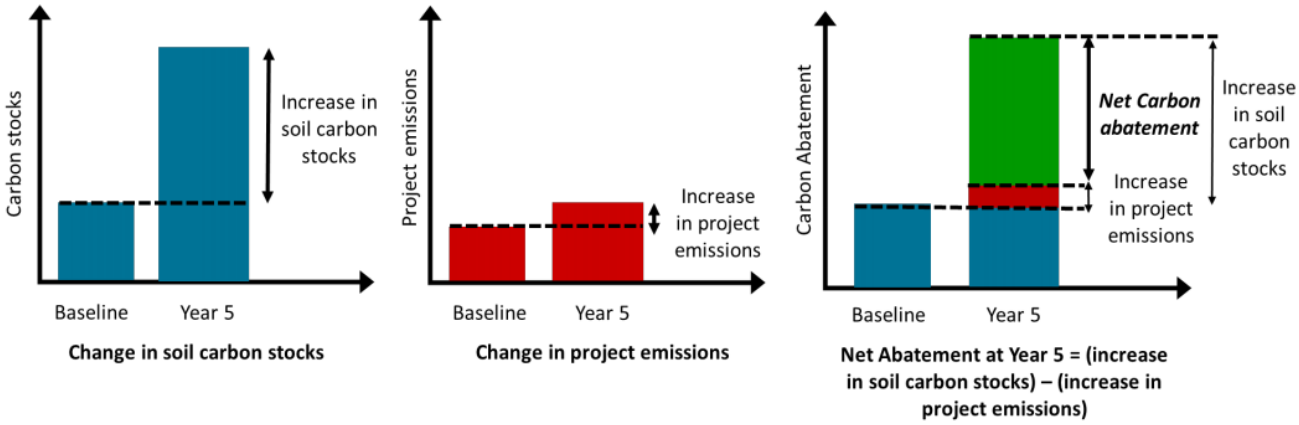


Figure 1: Measurement of soil carbon stocks and increases (Source: ERF Soil Carbon Method 2021)

Setting your goals

When you implement your new land management activities, the amount of carbon stored within the top layers of your soil (0-30cm) will typically increase first. As you continue to build up SOC, it will start to be stored deeper in the soil (30cm – 1m). Depending on your project objectives and the natural landscape across your property, you can choose to measure SOC increases within your soils at two different depths:

- Depth 1: 0 - 30cm
- Depth 2: 30cm – 100cm (or a depth between 30-100cm where 100cm cannot be reached)

Regardless of which depth you choose to claim credits for, the Soil Carbon Method 2021 requires you to take samples to a minimum depth of 30cm and a maximum depth of 100cm.

To determine which depth you would like to measure to, it is helpful to work with an agronomist to strategically set a viable target for what percentage SOC increase will be achievable across different depths. You must nominate the same depth across the whole Carbon Estimation Area (CEA, refer to). For example, if there are any rocky areas within your CEA which limits your sampling to 30cm, you will have to nominate a sampling depth of 30cm throughout the whole CEA.

We recommend setting an achievable goal across your 0-30cm layer and a lower goal should you wish to increase SOC through the entire 1m soil profile. An example has been provided on the next page to illustrate the different soil depths from a soil sample.

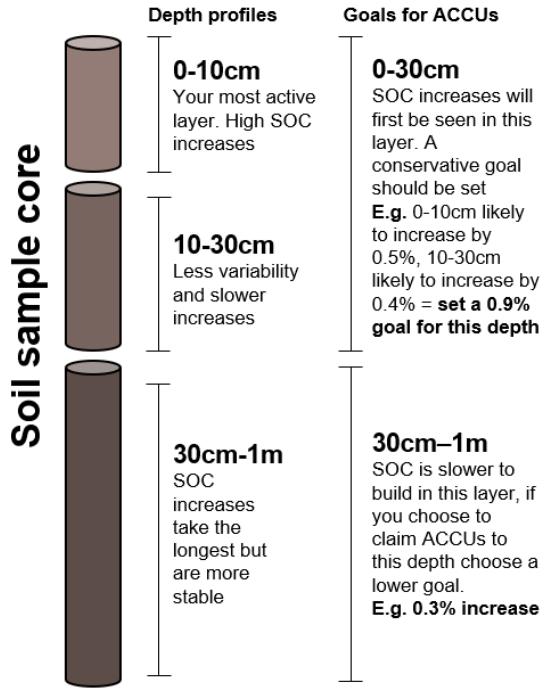


Figure 2: Example depths of a soil sample core and SOC percentage goals

Earning carbon credits on your project

Further soil samples, modelling and emissions calculations are taken throughout the life of your project to measure the changes in SOC and how much carbon is being stored (we recommend every 3-5 years). You must report on these changes no more than every 6 months, and no longer than every 5 years by submitting an Offset Report to the Clean Energy Regulator (CER).

The amount of carbon you've been able to store within your soils is calculated in 'tons of carbon dioxide equivalent' (tCO2e). This is a standard unit for counting greenhouse gas emissions regardless of whether they're from carbon dioxide or another gas, such as methane. Importantly, this unit is what you receive payment for.

1 ton of Soil Carbon = 3.6 tons of Co2e sequestered = 3.6 Australian Carbon Credit Units (ACCU's).

Submitting an Offset Report is what triggers the creation and issuance of ACCU's. ACCU's are registered financial products and will be issued in your name into an account within the Government Ledger. This is called an ANREU account, it is similar to having shares held in your name on a share trading account.

The Methodology

A soil carbon project needs to have its own program guide and 'methodology', which sets out the guidelines you must follow to receive credits according to the regulator (in this case the CER – Australian Government). The methodology (Carbon Credits (Carbon Farming Initiative— Estimation of Soil Organic Carbon Sequestration using Measurement and Models) Methodology Determination 2021) outlines the approaches that can be taken to measure the increase in soil carbon. These are usually by ongoing manual measurement (i.e., taking soil samples), or using soil samples to build computer models that estimate your carbon stocks (the hybrid method).

This guide focuses on the measurement-based method. This is because the modelled and measured (hybrid) method is still being tested and can result in some discounts to your carbon yields.

Farm benefits

Aside from the earning carbon credits, soil carbon projects can also benefit your farm by regenerating and improving soil function. This can result in increased farm productivity and other benefits including:

- Higher plant yields and productivity,
- Improved nutrient retention and cycling,
- Increased water-holding capacity,
- Better soil structure, stability, and biological activity,
- The degradation of pollutants.

Permanence periods

To ensure the carbon you've stored remains in the soil and doesn't re-enter the atmosphere, committing to a soil carbon project means you will need to maintain your carbon stocks and nominated activities for a period of 25 or 100 years after your first round of carbon credits are issued. This is called your permanence obligation.

For either option, your crediting period will always be 25 years – so, you will only be credited for any gains in soil organic carbon you report on over a 25-year period.

For a 100-year permanence obligation, the Government subtracts 5% of these credits as a security buffer. Essentially, they keep some credits as insurance in case some project failures, and you keep 95% of the carbon credits you generate during your 25-year crediting period. You need to continue to maintain your project activity and soil carbon stocks throughout the 100-year permanence period.

For a 25-year permanence obligation, you will have 25% of your carbon credits deducted as the carbon storage is considered less permanent (because you aren't required to maintain the activities beyond 25 years). So, you only keep 75% of the carbon credits you generate during your 25-year crediting period.

This is a long-term commitment. It is important that you can confidently select activities to build soil carbon that align with both your long-term commercial and on-farm objectives.

Steps to a soil carbon project

A soil carbon project doesn't have to disrupt your normal farm operation. We can assist you to seamlessly integrate the required actions into your existing farm calendar.

For example, in a cropping operation you may complete your baseline sampling post- harvest (i.e., when there is limited ground cover) and implement your new management activities following this. An example outline has been provided below, with further details provided under the Project Implementation section of this guide.

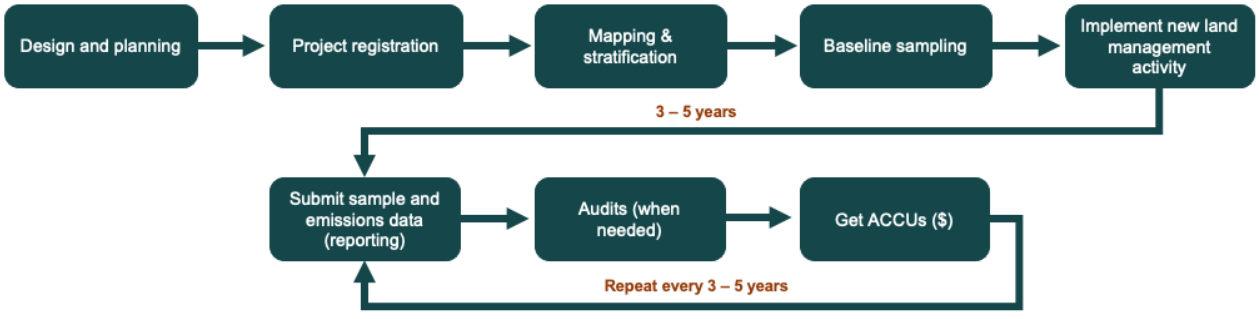


Figure 3: Indicative stages of a soil carbon project

Project Eligibility Checklist

To participate in a project activity using the Emissions Reduction Fund's *Estimating soil organic carbon sequestration using measurement and models* method (the 2021 Soil Carbon Method), applicants must demonstrate eligibility under the method's requirements.

We have provided a checklist below to assist you in understanding these requirements.

Table 1: Eligibility requirements:

Requirement	Explanation	
Ownership	You can demonstrate a legal right to run a soil project and claim carbon credits (either as landowner, lease holders, or a signed authority with other landowners).	☐
Eligible Interest Holder Consent	You can obtain consent to proceed from any persons or organisations with the activity from interest holders (banks, lenders etc). If this is not obtained before registration, the approval will be considered 'conditional'.	☐
Native title	The land is not subject to a Native Title determination or claim. If it is subject to a determination or claim, the proponent is prepared to ensure native title holder interests can be satisfied before proceeding.	☐
Regulatory Approvals	You need to ensure you have all relevant approvals, licences or permits that are required to carry out your new activities.	☐
Fit and Proper Person	You are recognised as a Fit and proper person to run an ERF project. The Fit and proper person test involves declaring any previous convictions or insolvencies and demonstrating capability to run a project.	☐
No-clearing period	The area selected for has not been cleared of forest cover or drained of a wetland within the last 7 years. No forest is required to be cleared during the baseline period.	☐
Previously agricultural land	The project area was previously used for pasture, cropping (which may include perennial woody horticulture i.e., vineyards), or bare fallow.	☐
Organosols	The land does not contain Organosols (peat soils).	☐
Newness	You have not commenced any site activities prior to registering the project with the ERF. (Note: baselining may commence prior to approval if the application has been *submitted*).	☐
Legislative additionality	The activity isn't required to be carried out under a commonwealth or state law.	☐
Permanence	You can maintain the soil carbon stocks on your land on site for either 25 or 100 years.	☐

In addition, it is also important that the 'on-ground' practical obligations of a soil carbon project are considered.

Table 2: Practical obligations of a soil carbon project:

Obligation	Explanation	
Pest and weed management	Consistent strategy required across the landscape in line with the LMS	☐
Local shire approvals	Consult your local Shire to determine whether the project requires any planning approvals.	☐
Soil Sampling	The soil can be sampled (e.g., you can access the area and there are not obstacles such as rock that will prevent sampling to a depth of at least 30cm, and it is reasonably expected that soil carbon can be increased through land management activities.	☐
Ability to continue to conduct land management activities	Ensuring that you can continue your selected land management practices for the duration of your permanence period, and that land use will not change.	☐

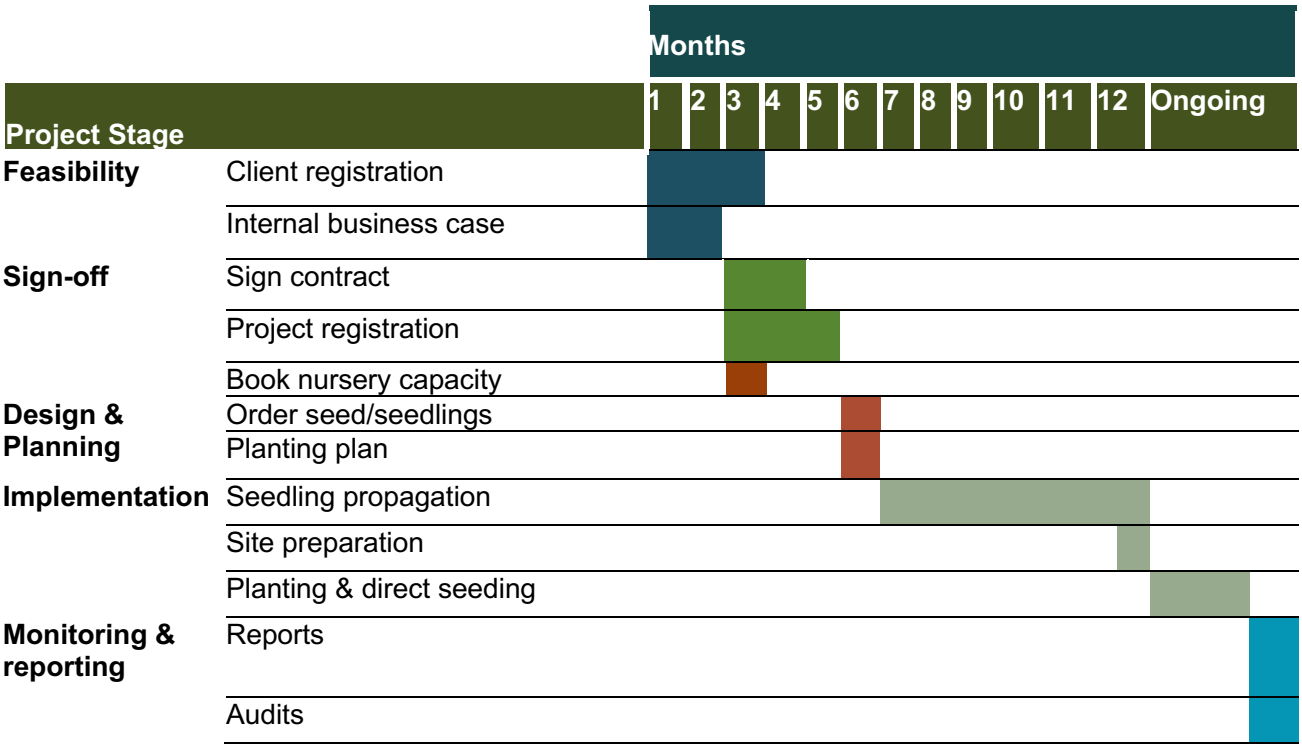
Project Implementation

Project timeline

Below are the key project stages for a soil carbon project. The stages highlighted have a clear critical path to enable implementation of your chosen land management activity(s) in any given year. It is best if you can integrate the soil carbon project within your existing operation timelines. There are some important milestones which must be achieved before you can move to the next step. Some considerations to keep in mind include:

- One of the first steps is to complete your **Land Management Strategy** (LMS). This must be completed to support your registration application. More details on the LMS are provided below.
- Baselining cannot commence until you have submitted your registration application. It is also good to time this when your soils are likely to already naturally be lower in SOC (e.g., post-harvest).
- You must have full project approval prior to commencing your new land management activities.
- Schedule your new land management activities to start when it suits your existing operations.

Table 3: Indicative project timeline



Feasibility

During this phase you are likely to be working with an agronomist and/or farm adviser to identify the type of land management activity you want to implement to improve SOC levels. It is also important to identify suitable areas for the project and ensure they're eligible (refer to the eligibility checklist on page 10).

Design and planning

The design and planning of a soil carbon project can be a large undertaking. We'll provide you with simple guides and checklists when you get to this phase to make sure your project gets off on the right foot.

Produce a Land Management Strategy

Your LMS will detail how you plan to increase the percentage of soil carbon across your project area. This includes the previous land usage, new management activities, and a description of your record keeping and monitoring procedures. The LMS needs to be reviewed and approved by an independent qualified third-party (e.g., an agronomist) prior to submission to the regulator.

The LMS is also required to be updated and reviewed by a qualified person at least every five years. Once your crediting period has been completed, over the remainder of your permanence period the LMS must continue to be updated and reviewed at least every 10 years.

Register your Project

Your project must be registered with the Emission Reduction Fund (ERF) to enable the project to claim carbon credits. Details of your project must be submitted along with your LMS and other key documents including:

- Geographic information of the project (including a geospatial map),
- Details about the project proponent and their experience,
- Evidence of your land's eligibility,
- A forward abatement estimate (i.e., how much carbon you estimate to store).
- Your baseline sampling plan (this is only required if you are working to a tight timeline would like to start baseline sampling prior to final approval),

We can help you generate this information using toolkits and software that help make this as simple as possible.

Planning your project areas

Mapping out your soil carbon project is an important step to ensure you are optimising the integration of the project into your existing operations. There are four key areas to define across your property.

1) **Project area –** This is the total area of your soil carbon project. It may cover your whole property, or a specific area within your property.
2) **Carbon Estimation Area (CEA)** – This is where you will measure the increase in soil carbon.
3) **Emissions accounting area (EAA)** – Any land within the project area that is not part of the CEA but will still be used for agricultural production (e.g., pasture, cropping or horticulture).
4) **Exclusion areas** – Areas within your project that are not used for agricultural production and will not contribute towards your project.

Once the areas of your project have been set, they cannot be changed or transferred to another type. For example, you cannot nominate an area to be an EAA and then change it to a CEA later.

An example of the project areas across one property can be found overleaf.

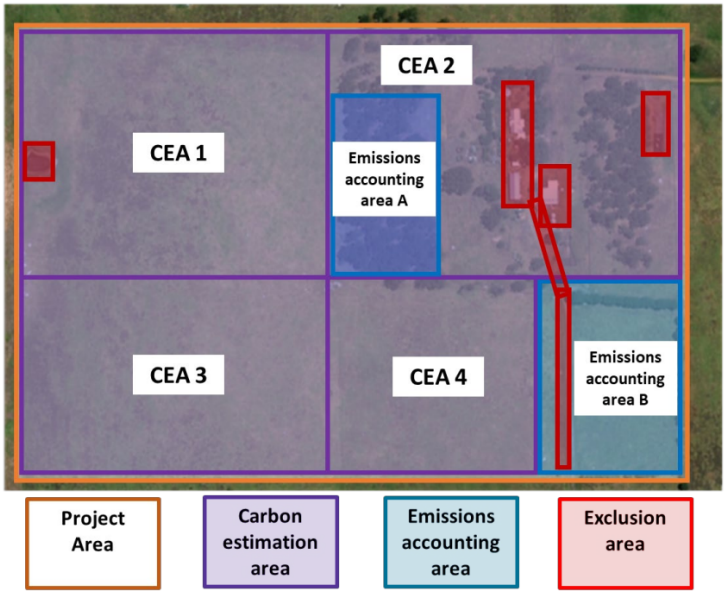


Figure 4: Example of project mapping (Source: 2021 Soil Carbon Methodology)

CEA's and sampling

Your sampling plan and the number of CEAs will greatly influence the overall project costs. CEAs are chosen typically based on prior land use, land features with natural similarities, and to group different eligible practices across a project. Finding the ideal number of CEAs involves finding a balance between your farm's objectives, the level of flexibility you need and costs, whilst accounting for the variability across your property. There are no requirements on the minimum number of CEAs.

Under the 2021 Soil Carbon Method, each CEA requires a minimum of 9 soil samples, with the final number of samples determined by stratification. Additionally, each CEA may have multiple, spatially disconnected parts across the property, as long as they have natural similarities such as soil type (see Figure 5). Reducing the number of CEAs will reduce the number of samples required (and therefore costs). Although this approach reduces costs, there is less flexibility for a landowner, as all land within one stratified section of a CEA must have the same land management activities applied (e.g., implement no tillage practices across all paddocks in one stratified part of a CEA).

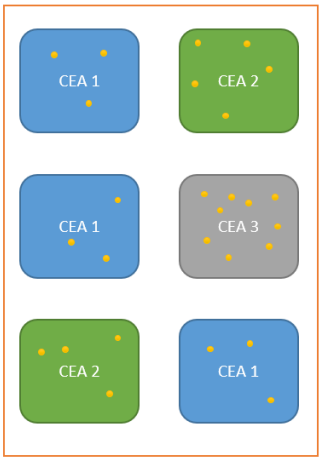
Alternatively, you may choose to have a greater number of CEAs, which will increase the number of samples you are required to take. This option increases the flexibility of the project by enabling different land management activities to be applied to different stratified areas. For example, you may choose to group paddocks together where you plan to re-establish pasture, group paddocks which you'll switch to no-tillage practices, and group paddocks where you'll plant legumes.

Figure 5 provides examples of the number of CEA's and samples needed, and the impact on cost.

Variance discounts

Soil carbon stocks are expected to be variable across agricultural land, regardless of any project activities. However, the Regulator penalises variance across strata by adjusting estimates of soil carbon change in case the observed changes are the result of sampling variance (referred to as 'sampling noise', or aberrations) rather than a change in management practices. The more consistent your increase in soil carbon is across samples, the lower discount is applied. The discount amount will depend on a complex equation and changes between project to project. Strategically stratifying your CEAs at the start of each sampling round means you have a more thorough picture of your soil carbon stocks across the landscape – and reduce the risk of carbon credits discounts.

Option 1: Grouped CEA's – Target: low variability



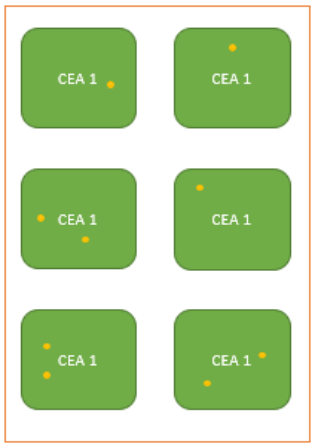
3 CEA's

27 sample points

$120 per sample*

$3240 total cost*

Option 2: Single CEA – Target low cost



1 CEA

9 sample points

$120 per sample*

$1080 total cost*

paddock
sampling point
property boundary

*Indicative cost for example purposes only and should not be relied upon for your project

Figure 5: Indicative CEA sampling variation and cost.

Achieving a balance in the number of CEAs across your property will come down to your project goals and management of costs. You may also need to potentially remove some CEAs for the project. Consider the following:

- A greater number of CEAs may allow for you to drop underperforming areas (i.e., those that are generating poor SOC yields).
- A lesser number means that an underperforming area may be located in a large CEA, and you will have less flexibility to simply remove an underperforming area. CEA boundaries are not able to be altered after the first sampling round.

STRATIFICATION

Stratification occurs within your CEAs and classifies the areas based on natural resemblances (e.g., soil type), into 'strata'. Under the 2021 Soil Carbon Method, you must divide each CEA into at least 3 strata and sample at least 3 times within each of these strata. Therefore, the minimum number of samples that can be extracted per CEA per sampling round is 9. Stratification and sample data will then be modelled using specialist software and analysis (see **Conduct project Baselining**).

Stratification can be completed before every sampling round, giving you the opportunity to group similar areas together and reduce sampling requirements and the variability within samples.

Staging your project

Under the Soil Carbon Method 2021 there are two options: starting all at once with management activities, or, adding new areas to the project area over time. Ultimately this decision should be made with your farm advisor and is highly dependent on your operation and the activities you plan to implement.

Key considerations may include:

- Timing baseline sampling for a new area at the same time as conducting another sampling round on the existing project to keep costs low.
- If you are considering staging your project and adding areas over time it is important to note that you must do so before the first offset report. You will only receive credits within the 25-year crediting period, regardless of when you add in new areas (i.e., if you add a new area in year 4 then you will only receive 21 years' worth of credits for this area- however you will add an extra 4

years to your permanence obligations). We can help you explore whether it may be more beneficial to register the new area as its own project instead to earn a greater number of ACCUs.

- You must undertake at least one eligible activity in all CEAs by the first sampling round. You may however choose to implement smaller management activities across all your CEAs first and gradually build them up to implement your full LMS.

Conduct project Baselining

Once you have submitted your project registration, you are allowed to commence project baselining. This involves defining the level of carbon currently in your soils and documenting your business-as-usual on-farm emissions. This involves:

1) **Calculate your on-farm emissions** - gather as much information about your emissions from the past 5 years as possible. If you're unable to provide 5 years' worth of records to support your calculations, alternative evidence or calculations may be used if deemed suitable by the regulator.
2) **Develop a sampling plan** - this ensures an accurate measurement of SOC. Natural variations will exist across your property and need to be considered within your baseline sampling. To achieve this, your project will need to undergo **stratification** (see example image below).

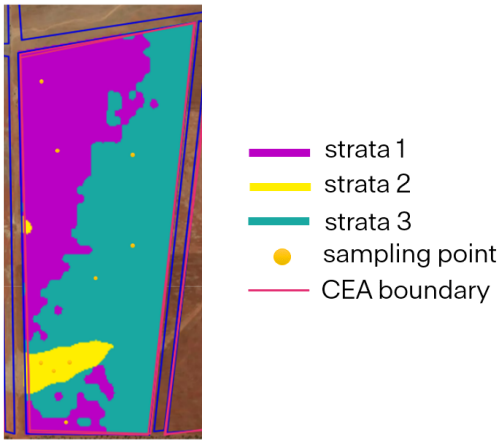


Figure 6: Example of project CEA divided into three strata (as indicated by the different colours of purple, teal and yellow) and three sample points randomly placed within each strata.

3) **Stratification** - to do this we use software platforms such as FarmLab. This software uses a complex data-driven algorithm to generate a stratification plan. This informs the sampling plan and ensures an accurate baseline is being set for the project.
4) **Take samples** - when taking samples, you are required to carry out the following:
   - Samples must be collected by an independent expert with a good understanding of the ERF sampling requirements. They must not have a financial interest in the project or be the person who completed your LMS. If you need help finding an independent reviewer, we can help connect you.
   - Samples are collected manually using a machine, which pushes coring tubes into the ground and extracts core samples.
   - Select project areas that can be sampled relatively easily to a depth of at least 30cm (i.e., avoid rocky areas and shallow soils).

   Traditional soil testing requires farmers, agronomists, or landholders to take samples from the field and send them off to a lab for analysis. However, recent advancements in technology have resulted in additional technologies such as Hone Carbon enabling the use of portable proximal-

sensing technology (known as spectrometry) to measure SOC in real time on-site. Spectroscopy costs approximately 15% more than conventional laboratory analysis during baseline sampling rounds but delivers cost savings of ~70% for subsequent crediting rounds. Hone Carbon's tool is one of the few that have been approved for use by the CER.

Once your sample analysis comes back, you will have a clear picture of your baseline and can get to planning your project.

Project mapping

As you will have already developed your LMS, you can use this to inform the design of your project. This involves accurately mapping out your CEA's, EAA's and exclusion zones. Mobile applications such as Avenza Maps can be useful to map out areas, identify fence orientation and other helpful points using GPS technology. We recommend working closely with your advisor/agronomist to do this. We are also available on an hourly rate basis.

Implementation

This stage of the project is when you will implement your new land management activities.

Note: the project must be approved by the ERF before any project activities (aside from baselining) can be undertaken.

Ongoing management

Measurement

There are two possible approaches for the ongoing measurement of your soil carbon under the Soil Carbon Method 2021. Keep your project objectives in mind to help choose the approach that is most suitable.

- Measurement approach: carbon stocks are measured using samples only, which are required to be taken within 1 to 5 years of your baseline sampling and then at least every 5 years. Each sampling round involves taking samples of soil from your project area in line with a random sampling plan and analysing them. When taking samples, they must be extracted within 60 days of the beginning of the sampling round to ensure that the samples are collected under similar circumstances. If using technology such as Hone Carbon, some but not all samples will be required to be validated in a lab.
- Hybrid approach: This approach uses a computer model to estimate your carbon stocks at intervals of 1-5 years and is supported by samples taken every 10 years. Given the reduced sampling requirements, this is a more cost-effective approach – but the numbers of credits you receive will be discounted given the model provides less accuracy than detailed measurement. There are also two models which can be used including:
    - Models **with** soil core samples (model assisted estimate): this further reduces the sampling density required and therefore reduces costs.
    - Models **without** soil core samples (model only estimate): this requires a more complex sampling plan and greater number of samples to be taken.
    - Regardless of the model used, under the hybrid approach samples must be extracted within 120 days of the beginning of the sampling round to allow for the calibration of a model and subsequent sampling to determine a model-assisted estimate.

For our financial modelling, we have assumed the measurement approach is used.

Reporting

You are required to provide information on the success of your project (in the form of offset reports) to the Clean Energy Regulator (CER) to determine how many carbon credits you are to be issued. You will receive credits at the end of each reporting round with your first report due within the first 5 years of the project life (but no earlier than 6 months). The first offset report is a more substantial deliverable than the

subsequent reports (for future crediting rounds), as it requires the first submission of much of your project information. The minimum number of offset reports you are required to submit throughout the 25-year period is 5, however, if you wish to receive credits more frequently (say, to generate more regular cashflow) you can report more often.

Timing your reporting

Soil carbon will naturally and seasonally fluctuate throughout the life of the project. To claim the highest number of credits it is helpful to time your reporting when your SOC is naturally high. Instead of only sampling when your offset report is due, you may choose to sample your soil on a more regular basis and strategically select when to submit your report. For example, if you start to take samples on an annual basis from year 3 onwards, you can time your reporting with the best seasonal SOC levels to claim the greatest number of credits.

To reduce the costs involved with more regular sampling, we recommend using spectrometry tools such as Hone Carbon. Purchasing your own tool will also give you the flexibility of taking samples when it suits you and allows you to report samples with the highest SOC levels and therefore gain the greatest return on your project.

Audits

A third-party audit of project Offset Reports is required by the CER. The number of reports varies depending on CER discretion (based on complexity and scale of the project). Generally speaking, three or four audits are required over the project lifespan with your first audit due upon the submission of your first offset report.

Coordinating credit issuance

Includes securing the services of a suitably experienced consultant to complete the Offset Reports, liaising between this consultant and the CER, and submitting the reports via the CER digital portal. Upon issuance of ACCUs, these units will appear in your ANREU account - where they can be held, retired, or transferred to other parties.

What happens if a disturbance event impacts my project?

A disturbance event (e.g. fire, drought etc) that effects greater than 5% of your project area must be reported to the Regulator within 60 days of the event occurring. Depending on the extent and cause of damage and the measures you had in place to prevent this, the Regulator will determine a suitable approach for addressing loss – which may include rebuilding your carbon stocks to return the affected area's carbon levels to its pre-disturbance state. Note that the crediting period for your project is fixed to 25-years and isn't extended due to this loss, so overall you will receive less credits for that area.

If you can't return your carbon stocks to their pre-disturbance state, you will have to pay back the credits you had accrued for this area. We've outlined steps you can take to reduce the risk of these loss events in the Key Risk and Success Factors table on page 19.

Restricted Activities

Under the 2021 Soil Carbon Method there are specific activities that are prohibited or restricted throughout the permanence period. These are controlled to ensure the project 'does no harm' and doesn't create 'leakage' of emissions. Leakage refers to project activities that cause carbon losses or emissions previously generated on your farm to be 'displaced' and generated elsewhere – meaning there is no real greenhouse gas reduction beyond your own farm gate.

Below is a simplified list of these activities. For more detail see **Section 3.4** within the ERF Simple Soil Method Guide.

Prohibited activities

- Destocking of land that was pasture (unless converted to a cropping system or facing drought or disease).
- Applying pyrolyzed material that is not biochar.
- Land management activities must not disturb the soil any deeper than 10cm above the baseline soil depth.
- For hypersulfidic materials in soils, lime must not be applied or activities that result in drainage or physical disturbance.

Restricted activities

- Clearing or thinning of woody vegetation on soil carbon CEAs with forest cover (to ensure there is no decrease in the amount of carbon stored within vegetation) however there are exceptions to this.
- Certain land management activities may be conducted, but must comply with strict guidelines:
  - Adding or re-distributing soil using machinery
  - Adding soil amendments containing biochar
  - Adding soil amendments containing coal
  - Applying irrigation to CEA's

Key Risk and Success Factors

Risk and success factors which could impact the successful implementation of the project are described in the tables below.

Table 4: Key risk factors

Risks Factors	Explanation	Possible solutions
Rainfall	Variability of rainfall can impact the project	Management of the project will need to be adaptable and respond to unpredictability, for example including irrigation or drainage solutions.
Cost of soil sampling	In the worst-case scenario, you would sample your soils to find no increase in soil organic carbon and therefore no carbon credits.	Although you would be out of pocket for the soil sampling costs, there would be no obligation to continue with the soil carbon project at this time. This means that your financial risk is capped at the cost of two sampling rounds.
Extreme weather conditions/events	Drought, flood, frost, or fire could impact your project	We recommend you monitor weather forecasts and investigate insurance options to mitigate financial implications of severe weather events. You should also consider the impact of both these and seasonal variation in carbon stocks when conducting your sampling.

Table 5: Key success factors

Success factors	
Inputs	Fertiliser, biochar, inoculants, bio-fertiliser / bio stimulants, wetting agents can improve project success rate when used correctly.
Data Management	The collection, storage, transparency, and quality of all data is crucial when it comes to carbon farming as it's ultimately what offers value to offsetting businesses.
Flexibility of CEAs	Balancing the number of CEAs to meet the needs of your project objectives and the cost of sampling will give you a greater ability to adapt your project throughout its lifetime. This can combat risk factors such low as rainfall, by allowing you to remove CEA's that have underperformed.

Co-Benefit Opportunities

What are co-benefits?

A co-benefit is a positive environmental, economic, social, or cultural benefit derived from undertaking a carbon project, which is additional to the sequestration of carbon.

Co-benefits can provide the project an additional income stream if attached to a carbon credit under an approved co-benefit program but also deliver other far-reaching benefits and enhancements for the land, farming operation and wider community.

Projects seeking to provide additional value to their carbon project will need to evaluate their land and the country surrounding it to determine what natural assets or ecosystem services can be derived from it. These may include any of the following:

Biodiversity & Conservation

- Proximity to high biodiversity areas or threatened habitats.
- Addressing fragmentation of remnant vegetation corridors
- Improving biodiversity through enhanced species diversity, richness, and complexity, or use of rare or significant species native to the area.
- Proximity to important waterways.

Ecosystem Regulating

- Improving resilience of agricultural practices.
- Enhancing productivity of high-risk or marginal agricultural land.
- Improving soil health and reducing soil erosion.
- Responding or building resilience to salinity.

Indigenous Economic & Cultural

- Providing opportunity for Indigenous employment or investment.
- Aligning management with Indigenous Land Management practices.
- Protecting, identifying, or restoring sites of heritage significance.

Co-benefit Programs

There are several recognised accreditors that address co-benefits projects using various methodologies. These methodologies have varying levels of rigour, corresponding to differing costs. Generally, in Australia, accreditation bodies provide the methodology which can then be applied to a government funding program.

Though anecdotally, having verified third party co-benefit accreditation could help to achieve a price premium from voluntary market buyers.

Whilst a co-benefit credit should provide greater value to a carbon credit, it will usually require a greater level of upfront capital, input, and ongoing management/reporting. This will need to be assessed to ensure any additional expense does not exceed the expected return.

Appendices

Appendix 1. Eligible land management activities:

Under the 2021 Soil Carbon Method the below land management practices can be implemented. You need to introduce one or more of these practices that is new or materially different to what occurred in the project's baseline period. If you are already doing one or more of these activities, **you do not need to stop** but need to add at least one new activity.

Eligible land management activities:

- Applying nutrients to the land in the form of a synthetic or non-synthetic fertiliser (from eligible sources) to address a material deficiency.
    - for example, applying compost or manure.
- Applying lime to remediate acid soils.
- Applying gypsum to remediate sodic or magnesic soils.
- Undertaking new irrigation.
    - this involves applying new or additional irrigation obtained through improving the efficiency of on-farm infrastructure and/or management practices within your project area.
- Re-establishing or rejuvenating a pasture by seeding or pasture cropping.
- Re-establishing, and permanently maintaining, a pasture 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 and/or improve soil health.
- Retaining stubble after a crop is harvested.
- Converting from intensive tillage practices to reduced or no tillage practices.
- Modifying landscape or landform features to remediate land.
    - for example, practices implemented for erosion control, surface water management,
- Drainage/flood control, or alleviating soil compaction. Practices may include controlled traffic farming, deep ripping, water ponding or other means.
- Using mechanical means to add or redistribute soil through the soil profile.
    - for example, clay delving or clay spreading.
- Using legume species in cropping or pasture systems.
- Using cover crops to promote soil vegetation cover and/or improve soil health.