Review of the Soil Organic Carbon Method 2021

Periodic Review of the Soil Organic Carbon method 2021 - Department of Climate Change, Energy, Environment and Water; The Emissions Reduction Assurance Committee

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The **Queensland Department of Primary Industries** appreciates the opportunity to provide comments to inform the Periodic Review of the Soil Organic Carbon Method 2021.

Assessment against the Offsets Integrity Standards

For the 2025 periodic review of the *Carbon Credits (Carbon Farming Initiative- Estimation of Soil Organic Carbon Sequestration using Measurement and Models) Methodology Determination 2021*[1] (SOC Method 2021) the Emissions Reduction Assurance Committee (ERAC) has requested feedback on compliance with the Offset Integrity Standards (OIS) and associated matters. This submission is framed around the questions in the DCCEEW Consultation Paper relating the six OIS and considers the scientific basis of approaches in the SOC Method 2021 and the potential for participation in the Australian Carbon Credit (ACCU) Scheme by Queensland farmers and other land managers.

1. **Additionality:** *A method should result in carbon abatement that is unlikely to occur in the ordinary course of events (disregarding the effect of the Act)*

Question 1: Whether current approaches to estimating sequestration adequately distinguishes sequestration driven by climate variability rather than project activities.

Question 2: Whether new requirements such as paired control sites, minimum time periods between sampling events, or the reinstatement of a regression approach to estimating net carbon abatement, should be considered.

Question 3: How might project costs and uptake be affected if new requirements such as those listed above were adopted?

The SOC Method 2021 sets out requirements and rules for crediting carbon sequestration in agricultural soils using a measurement only approach or a hybrid model-assisted measurement approach. The measurement only module replaced the SOC Method 2018[2] and comments made by ERAC in their published letter to the Minister recommending making of the 2018 method raised a concern on Additionality that is relevant. The ERAC wrote that while they assessed the draft Determination complied with the OIS, there was a concern regarding the '*capacity to accurately attribute measured changes in soil carbon levels to changes in land management over the initial 10-15 years of soil carbon projects*' which was due primarily to the dominant impact of variations in climate on soil carbon stocks. The advice from ERAC was that provisions in the Determination for calculating abatement were considered '*sufficiently conservative to mitigate the risk of over-crediting as a result of natural fluctuations in soil carbon*' and able to maintain method integrity. These provisions were (i) the use of direct measurement in combination with crediting no more than 50% of a positive change in SOC stocks over the first measurement period, i.e. baseline to the first project measurement round, and (ii) a regression approach to calculating abatement. The relaxation of these provisions in the SOC Method 2021 so that 25% rather than 50% of credits is withheld for the first project measurement period and use of crediting based on a two-point measurement

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[1] Carbon Credits (Carbon Farming Initiative—Estimation of Soil Organic Carbon Sequestration Using Measurement and Models) Methodology Determination 2021

[2] *SOC Method 2018* refers to the *Carbon Credits (Carbon Farming Initiative— Measurement of Soil Carbon Sequestration in Agricultural Systems) Methodology Determination 2018* (Revoked in 2021).

difference rather than a regression was introduced based on expert advice. However, analyses by soil scientists[3] [4] of ACCUs issued since 2023 have identified an apparent elevated risk of crediting non-additional SOC increases, notably when estimated abatement includes gains due to above-average rainfall rather than attributable to project management interventions.

Examination of the issuance in 2023 of around 230,000 ACCUs across projects reporting under the SOC Method 2021 inferred SOC sequestration rates during the period from baseline to first project reporting that are markedly higher (~2 to 8 t C $ha^{-1}yr^{-1}$) than those estimated in published studies and reviews of long-term field trials in Australia (~0.1 to 1.2 t C $ha^{-1}yr^{-1}$)[5] [6] [7] [8] [9]. Analysis based on publicly available project information combined with field measurements[2] indicated that the high SOC gains were largely the result of natural climate variability and that the enhanced SOC stocks were not maintained when rainfall returned to average and were vulnerable to dropping below baseline levels. While technically possible under the legislation for projects to be asked to relinquish issued ACCUs there are no precedents for this occurring for sequestration projects, meaning non-additional issuances are effectively over-crediting for the life of the project.

To manage the risk of crediting non-additional SOC sequestration that would have occurred in the 'ordinary course of events' (OIS (s 133(1)(a)), the portion of SOC stock increase estimated by project proponents that represents real additional abatement attributable to the project activities must be determined. This requires accounting for the impact of rainfall and other non-management factors.

Considerations for the Review

The experience now available from projects that have been issued with ACCUs under the SOC Method 2021, indicates that changes to improve compliance with the Additionality OIS are needed, including:

- *Regression-based SOC stock change estimates:* Crediting in the SOC method 2021 should revert to a regression-based approach as in the revoked SOC Method 2018 to improve the capacity to identify abatement attributable to management activities.
- *Reporting period:* Changing the required period between measurement rounds from *1—5 years* to *not less than 5 years* will improve the ability to account for temporal fluctuations due to rainfall. In combination with the regression approach this would mean that the first estimate of abatement would be 10 years into the project because a regression requires ≥ 3 points, which provides greater confidence that changes due to rainfall would have less impact on measured SOC stock changes. However, the extended time for projects to be eligible for credits is a barrier to participation since project establishment, including costly baseline sampling and analysis. To improve uptake the SOC Method 2018 introduced a protocol for issuing a proportion of ACCUs corresponding to estimated SOC stock change (with 60% Probability of Exceedance (PoE) applied to account for the uncertainty across all aspects of sampling and analysis; See discussion under Conservative OIS) as a form of forward payment. The proportion of estimated abatement estimate as the difference between the first two sampling rounds that was withheld from crediting was set to 50% in the SOC Method 2018. In the SOC Method 2021 the 'withholding proportion' was reduced to 25%.
- *Withholding proportion:* Increasing the proportion of estimated SOC stock increase withheld from credited abatement in the first reporting period to 50% as in the revoked SOC Method 2018 based on the evidence from four years of reporting under the SOC Method 2021. Where regional climate variability is high, unless the measurement period is addressed to avoid reporting periods of < 5

[3] Here's how to fix Australia's approach to soil carbon credits so they really count towards our climate goals
[4] Making soil carbon credits work for climate change mitigation
[5] C sequestration review reformatted final 260510_v2
[6] The_influence_of_land_use_and_management20160601-9056-1qxnreq-libre.pdf
[7] Soil carbon sequestration in rangelands a critical review of the impacts of major management strategies
[8] CSIRO PUBLISHING | Soil Research
[9] CSIRO PUBLISHING | Soil Research

years (See next dot point), withholding beyond the third measurement round would be necessary to provide greater confidence that only additional abatement is credited. Such a delay in crediting estimated abatement may discourage participation which may be partly addressed by a phased withholding approach where an interim crediting of a portion of the withheld abatement could be made, if this could be managed so as to not raise concerns about non-compliance with the OIS.

- *Dynamic baseline using control sites:* Improving the attribution of abatement to a new [eligible] management activity by requiring projects could be addressed by requiring projects to establish and monitor control sites. The project and control sites should have equivalent climate, soil and management (other than the project eligible activity) and must be closely located within or nearby the project area. Control site data enables rates of SOC sequestration in CEAs following implementation of a new eligible management activity to be compared to dynamic baseline rates that reflect non-management changes, but only if the control sites provide an adequate reference across all drivers of SOC change. Where feasible, the reference site approach would ensure additionality but would represent higher costs and resource-use than the current point-in-time baseline. This may be at least partially compensated by a lower withholding and variance discount.
- *Consistency with IFLM native forest regeneration measures:* Taking the opportunity to ensure consistency between ACCU Scheme sequestration methods, including the Integrated Farm and Land Management (IFLM) method currently under development. This would necessitate applying the same rigour to a varied SOC method as that under consideration for native forest regeneration accounting, with current discussion considering a reference site approach. As for the previous Human Induced Regeneration Method there are similar concerns due to rainfall being the key determinant of change in forest regrowth, with management strategies (e.g. grazing) having a smaller, variable and hard to predict impact. Additionally, in both vegetation and soil project types, sequestration rates are influenced by initial baseline condition of the land and soil.

2. **Measurable and verifiable:** Estimates of abatement should be measurable and capable of being verified

Question 4: Whether the method's provisions for measuring and verifying abatement estimates are fit for purpose.

Question 5: Whether there are new technologies or measurement approaches, which should be considered in potential amendments to the SOC Method 2021.

The two approaches to estimating abatement in the SOC Method 2021 provide more flexibility and the possibility of lower-cost options for project developers than in previous Emissions Reduction Fund (ERF)/ACCU Scheme soil carbon sequestration methods. The increase in project registrations indicates that this is more attractive for prospective participants. However, due to the limited number of projects that have reported and the lack of transparency in the application of measurement only and model-assisted measurement options, it is difficult to assess whether the method's provisions provide adequate accuracy and verifiability.

Ongoing research and technology developments are improving confidence that measure-model approaches have the potential to provide accuracy in calculations of SOC stock changes and a capacity to be audited but as yet are largely unproven or widely available for general use. Soil measurements, process modelling and flux data each have documented limitations and uncertainty across different scales of spatial and temporal variability. An approach that integrates sampling, sensing, and modelling may offer a more promising pathway to balancing cost and accuracy to support understanding and predictability of SOC sequestration potential for different agricultural management systems in current and future climate scenarios[10].

[10] Petropoulos et al 2025.pdf

Ultimately this should support integrity in issued SOC ACCUs and there is active research globally to accelerate wide access.

Considerations for the Review

Recommendations for ensuring abatement is measurable and verifiable as well as cost-effective and accessible for the SOC Method 2021 include:

- Evaluation of new technologies and measurement approaches being considered for the SOC Method 2021 should be primarily guided by whether they are fit-for-purpose, i.e. suitable for quantification and verification of permanent increases in SOC stocks attributable to an eligible change in management of agricultural lands. They should also enable an appropriate level of transparency in data and calculations for independent assessment of whether the level of abatement is consistent with accepted science of SOC dynamics.
- Development of a database of reasonable and defensible upper bounds[3] for rates of increase in SOC stocks over the permanency period (25 or 100 years) that are consistent with Net Primary Production (NPP) values applicable to regional climate and soil conditions and land use would enable identification of outliers. Undertaking on-ground auditing and/or partial withholding of ACCUs in these outliers before further crediting would improve confidence amongst the scientific community and markets. As data availability and scientific understanding of rates of change by depth[11] [12] improve the database could disaggregate rates of sequestration by depth increments (e.g., 0-30cm and 30 – 100cm) to further increase transparency.

3. **Eligible carbon abatement:** A method should provide abatement that is able to be used to meet Australia's international mitigation obligations

Question 6: Whether changes to the method should be made regarding eligible carbon abatement that can be counted in Australia's National Greenhouse Accounts

The 'eligible carbon abatement' OIS (s 133(1)(c)) requires the carbon abatement credited under the SOC Method 2021 to be 'able to be used' towards achieving Australia's legislated emissions reductions targets under the Paris Agreement. This calls for alignment of the SOC method 2021 with the accounting methods used to measure and report changes in soil carbon in grazing and croplands for Australia's national greenhouse gas accounts. While the ERAC was satisfied that abatement under the SOC Method 2021 satisfied this requirement, the abatement credited in the ACCU Scheme does not yet count towards the national commitments. Further it is likely that changes will be needed to the calculations used in the national accounts, e.g. to include SOC stock changes at depths >30cm, before ACCU estimated sequestration will be counted as removals. With few projects having reported, and crediting for only one reporting period in most, addressing this inconsistency requires more data but reporting is accelerating.

Considerations for the Review

- There should be continued monitoring of strategies and requirements to improve the alignment between the ACCU Scheme SOC Method 2021 and the national inventory accounts to ensure Scheme crediting remains eligible abatement and data quality requirements are met.

4. **Evidence-based:** A method should be supported by clear and convincing evidence

Question 7: Whether there is new or different evidence on the emissions reduction from sequestrating soil organic carbon on agricultural lands, which should be considered in this review

[11] Factors Controlling Soil Organic Carbon Stocks with Depth in Eastern Australia
[12] dalal-rc-etal-2005total-soil-organic-matter-and-its-labile-libre.pdf

Many of the 13 eligible activities listed in the SOC Method 2021 have evidence of beneficial impacts on soil quality and function in some (not all) agricultural lands. However, the evidence for positive and permanent increases in SOC stocks is much more equivocal due to relatively few long-term trials with high quality data across the diversity of climate, soil, landscape and management systems in Australia[13] [14] [15]. Despite a long history of agronomic and soil research and more than two decades of interest in biospheric carbon removals there is little 'clear and convincing evidence' that enables confident predictions of the abatement from sequestering SOC in agricultural lands under different management strategies in diverse climate and landscape conditions. To be robust for a specific location, practice and agricultural system, the evidence must account for the influence of multiple interacting factors, including climate (temperature and moisture), soil properties (e.g., soil type, texture, clay content), nutrient levels, management history, agricultural system (e.g. cropping or grazing) as well as contemporary management. Predictions also require sufficient understanding of still-evolving science of the dynamics of SOC and soil functioning[16].

While investment in research and data globally and in Australia has accelerated since the Paris Agreement was signed in 2015, important gaps remain in understanding the potential contribution of soil carbon sequestration to climate change mitigation. An overarching observation from a number of science reviews is that the systems are complex and observed responses are frequently inconsistent. While some opportunities are recognised, there is a growing body of evidence that previous predictions of potential SOC sequestration through improved land management may have been overly optimistic[6] [17] [18] [19]. More high quality, long-term studies are needed in Australia but the effects of implementing activities such as reduced tillage, crop residue retention and rotational grazing on SOC in agricultural soils are now being reassessed. The nature of this emerging evidence can be illustrated with two brief examples:

1. *Eligible activity - converting from intensive tillage practices to reduced or no tillage practices*
   Claims that changing to no-till agricultural practices (rather than conventional tillage) will sequester carbon in cropping soils is challenged by the growing body of experimental evidence showing that the quantity of additional SOC under no-till is relatively small[13]. Earlier apparent increases (some based on measurement of the top 10 cm soil only) appear likely the result of altered depth distribution[10].

2. *Eligible activity - altering the stocking rate, duration or intensity of grazing to promote soil vegetation cover and/or improve soil health*
   Several reviews or meta-analyses of evidence from grazing trials have reported marked inconsistencies in soil carbon response and available data for the vast semi-arid regions with predominantly extensive grazing systems that represent a relatively high proportion of registered ACCU Scheme SOC projects (including 'Soil carbon sequestration in rangelands a critical review of the impacts of major management strategies', Attachment 1)[20] [21]showed few significant grazing management effects on SOC stocks. In summary, trials comparing economically sustainable grazing intensities (light to moderate stocking rates) found no significant effect on vegetation or soil[22] but consistent negative impacts on SOC stocks of prolonged high grazing pressure. Various forms of rotational grazing (variously labelled holistic, time-controlled, multi-paddock, cell grazing) did not provide consistent evidence of a significant effect on SOC[6] [23]. In future, more sensitive measurement methods may facilitate detection of changes in SOC stocks and attribution to grazing management, but at this time the evidence in most rangeland livestock systems is not sufficiently robust to predict persistent management-caused SOC sequestration. Further

[13] Unexpected increases in soil carbon eventually fell in low rainfall farming systems
[14] Baveye et al 2023.pdf
[15] Studies from global regions indicate promising avenues for maintaining and increasing soil organic carbon stocks
[16] Global Change Biology - 2023 - Cotrufo.pdf
[17] Global Change Biology | Environmental Change Journal | Wiley Online Library
[18] Powlson and Galdos 2023.pdf
[19] Photosynthetic limits on carbon sequestration in croplands
[20] Soil carbon sequestration in rangelands a critical review of the impacts of major management strategies
[21] Grazing management for soil carbon in Australia: A review
[22] Derner et al 2019.pdf
[23] A holistic view of Holistic Management: What do farm-scale, carbon, and social studies tell us?

research is needed to monitor slow changes occurring over extended periods following implementation of practices such as rotational grazing or less well-defined activities called 'regenerative agriculture' that show a more consistent positive impact such as higher ground cover but with no detectable SOC increase[24].

Considerations for the Review

Two possible ways to improve the compliance of the SOC Method 2021 with the *Evidence based* OIS may be considered:

- Conducting a critical review of the state-of-the-science for each eligible activity listed in the SOC Method 2021 (and any others being considered for inclusion) to develop a revised list of activities with eligibility based on robust evidence for a positive impact on SOC and the regions and systems for which this evidence is valid. It is expected that the evidence-based list of activities and locations for eligibility would be smaller than the current list.
- For a defensible approach using existing knowledge, eligible activities could be restricted to two options that have broad acceptance amongst soil scientists:
  - For change in land use, conversion from cropping to permanent grassland/pasture, which largely aligns with the current eligible activity: *re-establishing, and permanently maintaining, a pasture where there was previously no or limited pasture, such as on cropland or bare fallow*.
  - Within a land use category, implementing improved practices on land with soil degraded by historic management such as regular cultivation and bare fallow or prolonged high grazing pressure. Demonstrating eligibility could be based on baseline measurements showing depleted levels of SOC relative to the regional/neighbouring long-term average SOC content. This option is conservative but offers lower flexibility for project proponents and could result in lower participation despite the potential for co-benefits in the form of improved productivity and/or ecosystem services.

5. **Project emissions:** Material greenhouse gas emissions emitted as a direct result of the project should be deducted

Question 8: Whether the method sufficiently accounts for material greenhouse gas emissions directly resulting from carrying out the project

The SOC Method 2021 updated requirements in earlier ACCU Scheme methods (2018) by including an equation to account for nitrogen emissions from cover crops, which was not included in the 2018 soil carbon method. It also expanded the table of emissions factors in the supplement to include cover crops to allowed calculation of the net abatement amount to account for GHG emissions associated with cover crops.

Considerations for the Review

Consideration should be given to:

- Continued checking of project reporting to ensure correct implementation of provisions in the SOC Method 2021 for calculating net abatement.
- Updating the emission factors to align with the values used in the National Greenhouse Gas Inventory as needed for consistent alignment.

6. **Conservative:** Where a method involves an estimate, projection or assumption, it should be conservative

[24] Sutton et al 2025.pdf

Question 9: Whether the existing measures, such as permanence discounts, and the temporary withholding of ACCUs at the first measurement period, are sufficiently conservative for estimating abatement.

Question 10: Whether the SOC method 2021 should be varied to include additional measures such as, further discounts, caps on the rate of conversion of plant biomass to soil carbon or reasonable upper limits on the rate of increase in soil carbon to ensure conservativeness.

The Conservative standard is not independent of the Additionality and Measurable OIS and some points made earlier in this submission are relevant also to Questions 9 and 10. Also relevant to assessing whether the SOC Method 2021 involves 'estimates, projections or assumptions' that are conservative (s 133(1)(g)), are the constraints in data from sampling and analysis evidence for assumptions and limits in model functionality that result in uncertainty in abatement estimates whether by measurement only or the hybrid approaches in the SOC Method 2021. The Conservative OIS requires that the SOC Method 2021 should include provisions adequate to enable unbiased and conservative estimates of abatement and also to mean that ACCUs issued for the abatement achieved are likely to be conservative in order to manage the risk of over-crediting to avoid creating carbon offsets without integrity.

Assessment of conservativeness in estimates of abatement is summarised with reference to further information under the Additionality and Measurement OIS before discussing the concerns for conservative issuance of ACCUs from projects reporting under the SOC Method 2021. This discussion draws on a comprehensive analysis of the behaviour of the SOC Method 2021 by the Queensland Department of the Environment, Tourism, Science and Innovation (DETSI) Attachment 2[25].

Conservative abatement estimates in SOC Method 2021 (Refer also to Additionality and Measurement OIS)

- *60% Probability of Exceedance*: Whether issuing ACCUs for an estimated increase in SOC stocks based on 60% PoE is adequate to allow for the uncertainty across all aspects of sampling and analysis depends on: (i) whether the representative mean for a CEA is estimated without bias using the randomised statistical sampling design protocol (at least 3 samples; at least 3 strata); and (ii) whether the level of uncertainty in sample preparation and laboratory or field analysis is small and random relative to the magnitude of the real change in SOC stocks between T_0 and T_1. The risk of non-conservative crediting is greater where spatial and temporal variability are high – a situation characteristic of many areas with registered or planned SOC projects.
- *Risk of Reversal and Permanency Discounts:* There is insufficient information and data from reporting projects or from relevant research to assess the adequacy of the 20% permanency discount which, for projects electing a 25 year permanency period, is added to the standard 5% Risk of Reversal discount. However, persistence of sequestered SOC for the duration of the permanency obligation has very high technical and practical uncertainty. It is recommended that independent as well as project proponent monitoring be maintained and that data from measurement rounds be made available for ongoing expert analysis of the impacts of both climate and management during the crediting period and preferably for the full 100 year permanency period to improve understanding of the risk of re-release of stored SOC, and the integrity of carbon offsets[26].
- *Withholding percentage and regression approach*: As discussed for the Additionality OIS, increasing the withholding percentage to 50% of the estimated abatement in the first measurement period and estimating change using a regression approach would help to manage the uncertainty in the impact of management vs natural influences on SOC dynamics and impacts of a variable and changing climate and ensure a more conservative outcome for crediting.

Conservative issuance of ACCUs in SOC Method 2021

[25] Search - Department of the Environment, Tourism, Science and Innovation - Liberty

[26] Roxburgh, S.H., Paul, K., Pinkard, L. (2020) Technical review of physical risks to carbon sequestration under the Emissions Reduction Fund (ERF). Final Report to The Climate Change Authority. CSIRO, Australia.

The number of ACCUs credited to an SOC Method 2021 project at the end of a reporting period depends not only on the estimated SOC stock change estimated for that period of time (1 to 5 years) but also how the provisions in the method are applied in the design of a project, as shown in an analysis by DETSI[25]. The analysis focussed on the measurement only approach in which estimates are based on the difference in SOC stocks between the baseline sampling (T_0) and a subsequent sampling round (for the first reporting period: T_1). The assessment of anti-conservative project design and results are likely also relevant to assessing the conservativeness of crediting in the hybrid approach in the SOC Method 2021.

Despite estimates of abatement being conservative to the extent of calculations using a 60% PoE, there remains a material risk to conservativeness due to the absence of regulatory penalties, such as relinquishment of ACCUs once issued[3 4 25]. This is relevant where the SOC stock change over a measurement period is not positive relative to the baseline, i.e., zero change or, more significantly, a negative change (measured net loss of SOC). There are situations whereby the Clean Energy Regulator (CER) can require a project to relinquish ACCUs issued for a sequestration project, e.g., when the project proponent has been deliberately fraudulent in their reporting or has not reasonably complied with maintenance obligations, but the provision has not been exercised. It appears unlikely that relinquishment of ACCUs will be enforced for over-crediting for SOC sequestration early in the crediting period, which indicates a material risk of non-conservative abatement over the life a project as outlined:

Issuance of credits in a sampling round when the reported quantum of SOC stock increase is not maintained or when SOC stocks are lost in subsequent rounds: Regardless of the actual SOC change between T_0 and T_1, the (stratified) randomly selected sampling locations could provide estimates of no change, decline or increase in SOC stocks due to spatial variability and often small and slow actual rates of change. In a situation where there was no real change, an apparent positive change would be rewarded with credits for the estimated [non-real] sequestration, while for an apparent negative change there would be no consequences. Where this situation is repeated for subsequent sampling rounds the size of the over-crediting increases without risk of penalty, i.e. without relinquishment of ACCUs already issued. The risk of over-crediting is exacerbated when proponents have the option of dividing their area of intended registration under the scheme into multiple projects each with one CEA and where the time between sampling rounds is reduced to the lower end of the allowed 1 to 5 years. These features would increase the likelihood of over-crediting making it close to guaranteed, and clearly not conservative.

Considerations for the Review

The results of an evaluation of the behaviour of the SOC Method 2021 demonstrated that:

- When the spatial variation of SOC is large and the temporal change of SOC small, the method can produce anti-conservative crediting and give the largest expected crediting with the least permitted soil sampling points.
- A design approach that splits the land into multiple projects, each project a single CEA, can give close-to-guaranteed crediting, which might make it an attractive strategy to proponents.

In summary, the results show that, in a situation of small temporal change and high spatial variation, the largest expected crediting is produced with the least permitted sampling points and that a design approach that splits the available land into multiple projects each having a single CEA can give almost guaranteed crediting, making it a financially attractive, though environmentally undesirable, strategy for proponents.

The conclusion from these results is that, without elimination of the features of the method shown to be problematic, there is a potential for large over-crediting in projects when there has been no real SOC sequestration. The estimates of abatement would not be conservative, and the method should be varied to manage the risk.

Usability and other improvements

Peer reviewed studies emphasise the importance of transparent data sharing to enhance the credibility of SOC estimation methods. SOC dynamics are highly complex, with outcomes that are sensitive to variations in soil type, climate, and management practices. Making SOC testing results publicly available would allow independent verification of any amendments to the SOC 2021 method and provide a more robust basis for assessing its accuracy. This approach aligns with Recommendation 4 of the Chubb Review, which advocates for legislative amendments to maximize transparency and public trust. By defaulting to public data disclosure, including carbon estimation areas and SOC soil sample test results, all stakeholders can engage in continuous improvement of SOC assessment methodologies, thereby strengthening the overall integrity of Australia's carbon accounting framework.

Establishing a national platform or utilising existing State based platforms to share SOC testing data from ACCU projects can foster greater collaboration between government, researchers, and industry. As highlighted by recent studies, open data practices have been instrumental in driving innovation and reducing uncertainties in environmental assessments. A publicly accessible repository of SOC testing results would not only support rigorous scientific evaluation but also facilitate comparative analyses across different regions and management systems. This enhanced transparency would, in turn, improve the credibility of the ACCU scheme and contribute to more informed decision-making in climate change mitigation strategies, ensuring that SOC management practices are both scientifically sound and publicly accountable.