CARBON MARKET WATCH

Overview of the Carbon Removals and Carbon Farming Certification process

In December 2024, the EU launched its certification framework for permanent carbon removals, carbon farming and carbon storage in products, commonly known as the Carbon Removals and Carbon Farming (CRCF) certification Framework.

As its name suggests, the CRCF aims to certify a variety of practices or processes, namely: permanent carbon removals, carbon farming, and carbon storage in products. Each practice involves specific activities for which tailored methodologies are currently being developed. The methodologies will be published as Delegated Acts, taking on the force of law. Note that the Regulation only offers guidance on the basic rules for developing the methodologies (Articles 4 till 8) and the elements they should contain (Annex I).

Overall, the activities involve:

1. **Permanent removals:** direct air capture and storage (DACCS), biomass with carbon capture and storage (BioCCS) and biochar. Biochar is currently classified as a permanent removal activity - yet uncertainty persists on its storage length. Therefore, a key aspect of the methodology is determining how much of a given biochar batch will be stored for at least several centuries.
2. **Carbon farming (emissions reductions and carbon sequestration):** peatland rewetting and restoration, agriculture and agroforestry on mineral soils, and planting of trees.
3. **Carbon storage in products**, mainly wooden construction elements.

Note that the list of activities is likely to expand.

As established in Articles 4 to 7 of the CRCF, the methodologies will follow the so-called QU.A.L.ITY criteria. These are the quantification of climate impacts (against a baseline), the additionality of the activity, its long-term storage and liability for early release into the atmosphere, and sustainability. The methodologies should set out robust conditions, tests and safeguards that eligible activities need to comply with to be certified under the scheme. However, as a voluntary framework, the decision on whether to participate in the scheme or not rests with the operators and certification schemes.

While the European Commission and its consultants are developing the methodologies, these are also being discussed within the EU Carbon Removals Expert Group (CREG) of which CMW is a member. Note that, in addition to CREG meetings, numerous online workshops, discussing particular sections of (at times specific) methodologies, e.g. quantification in forestry, are held throughout the year.

Unfortunately, the CREG is largely dominated by industry lobbyists, which skews the balance during discussions and diminishes vital voices from independent experts, researchers, and civil society. As an active member of the CREG and the CRCF process in general, CMW has sought to rectify this imbalance by hiring its own consultants to thoroughly review the methodologies and flag pertinent issues.

This document sets out the feedback received for the agriculture and agroforestry draft methodology (published in April 2025) by Öko-Institut, Greenhouse Gas Management Institute, and Carbon Plan. Carbon Market Watch submitted its written feedback to the European Commission through the CRCF EU survey. By sharing this information, we hope to contribute to the debate and shed further light on the numerous issues affecting the methodologies.

Policy Brief | 05.05.2025

Second assessment of the draft technical specifications for certification under the EU CRCF

Agriculture and agroforestry on mineral soils

// Anne Siemons and Lambert Schneider

Summary of key findings and recommendations

This document provides an assessment of the proposed draft for an EU certification methodology on agriculture and agroforestry on mineral soils (referred to as “draft methodology”) provided on 15 April 2025.

Overall, the draft methodology, in its current form, ignores fundamental principles of carbon crediting and does not comply with the quality criteria established under the CRCF. Applying the methodology would result in the issuance of units that do not represent any actual emission reductions or removals. Key issues identified include:

- **Overall, the draft methodology lacks details on how the requirements shall be operationalised and implemented.** In many sections, requirements are formulated as general principles, but it remains unclear how compliance with these requirements must be demonstrated and will be checked. Further elaboration of the methodology is therefore necessary to turn it into a technical document with clear and unambiguous instructions, which operators can rely upon when developing their activities.
- **Leakage risks are not addressed appropriately and can lead to large overestimation of removals or emission reductions:** The methodology does not consider potentially large sources of leakage, neither from shifting activities to other land nor from indirect land-use change. Provisions to address potential carbon leakage have been removed from the draft methodology. The draft methodology does not account for the risk that carbon removals or soil emission reductions on certified parcels are compensated by an increase in soil emissions on other land (under the operational control of the operator or elsewhere). The draft methodology simply states that carbon farming activities

that improve soil management are unlikely to result in carbon leakage because crop or grass production is maintained and the long-term resilience of such production is enhanced (p. 28). This is not appropriate as the proposed activities impact the agricultural product range produced from a specific land parcel. For example, improving crop rotations or converting arable land for fodder crops to permanent grassland imply that the amount of a specific agricultural product produced from this land is reduced (i.e. a specific crop that is cultivated less frequently; fodder crops) so that activity shifting to other land could occur to meet the demand for this product. **Not accounting for such leakage effects may lead to significant overestimation of removals or emission reductions.** In the eligibility criteria, it is stated that there shall be no significant loss of organic carbon stocks on the land under the operational control of the operator due to land use change such as conversion of grassland to cropland or of forest land to cropland (section 1.1, p. 13). However, it is not specified how this should be demonstrated or verified. **Guidance must be added to the draft methodology on how leakage to other parcels is to be identified and what would be the consequences of leakage for quantifying carbon removals and emission reductions achieved through the respective activity.** We recommend addressing leakage risks through applying default factors in the quantification of achieved emission reductions or removals. Tools and methodologies to account for leakage effects are available from other carbon crediting programmes and should be used. **We support the current proposal to only quantify changes on the parcels where the activities take place and quantify N_2O emissions at the level of the whole farm holding.** Farm-level monitoring for carbon stocks may imply high burden for operators and involves large uncertainties due to a low signal-to-noise ratio (i.e. there might be significant fluctuations of carbon stocks on land on which no carbon farming activity is implemented due to other factors; the impact of carbon farming activities is difficult to measure due to high soil heterogeneity across area and this uncertainty is aggravated if carbon farming activities are implemented only on a small share of the land under the control of an operator).

- **High flexibility to choose between different models, methods and approaches is not a robust approach to quantification:** The draft methodology provides different options that operators can chose from to quantify the mitigation impact of practices that increase carbon removals or reduce emissions from agricultural soils (section 2.2). These options include tier 3 models (eligible for quantifying carbon removals, LULUCF soil emissions and agricultural soil emissions), ground-based measurements (eligible for quantifying carbon removals and LULUCF soil emission), data calibration models using remote sensing data (eligible for quantifying carbon removals in biomass), and tier 1 and tier 2 emission factors (eligible for quantifying agriculture soil emissions or associated GHG emissions). Experience from improved forest management and avoided deforestation projects in the voluntary carbon markets have shown that flexibility to choose between different quantification approaches makes methodologies vulnerable to adverse selection as operators will likely apply those models that result in highest emission levels in baseline scenarios. This has led to considerable overestimation of emission reductions.
- **Provisions on accounting for uncertainty of quantification approaches are not appropriate:** The provisions for accounting for uncertainty in section 2.7 lack specification as it is not clear how the uncertainty deduction factor is to be calculated and applied. Additionally, uncertainty regarding the assumptions which tier 3 models (quantification approach 1) are based upon do not seem to be accounted for. Furthermore, it is not appro-

priate to assume that the prediction error of tier 1 or tier 2 emission factors for quantifying N_2O emissions from managed soils (quantification approach 4) is zero. Applying tier 1 or tier 2 emission factors for N_2O emissions from managed soils may lead to overestimating emissions and thus also emission reductions claimed through changing fertilising practices. These provisions should be revised to ensure that achieved carbon removals and emission reductions are quantified in a conservative manner.

- **Multi-layered exemptions for demonstrating additionality create high risks to register many projects that do not need CRCF funding to become viable**: The many exemptions that the methodology provides for project operators in section 3 to demonstrate additionality of carbon farming activities on agricultural soils are very concerning. Operators must demonstrate that the activity is not legally imposed on them. However any activity remains additional during the entire activity period, even if it became obligatory for the operator under national legislation. This means that if an activity becomes legally imposed during the activity period, operators would be entitled to non-additional carbon removals and soil emission reduction units under the methodology for the remainder of the activity period. Such an approach creates unfairness and arbitrariness in treating different operators on agricultural land. An operator who did not register an activity with the CRCF before the activity became obligatory under national legislation would have to bear the full cost to fund the necessary activities for complying with such a law. An operator who did register with the CRCF would be subsidised with CRCF units to fulfil the same legal obligations as the other operator.

  Operators must further demonstrate that the activity is not financially viable without the incentives created by the CRCF. For this, they must conduct either a simple cost analysis or an investment comparison analysis. However, under the methodology activities are exempt from conducting these financial viability tests if they already receive state aid or public subsidies. Automatic exemption only applies if public subsidies have a "claw-back" mechanism (i.e. must be repaid once CRCF revenues become available) or do not cover the same aspects as the activity proposed for CRCF funding (e.g., smaller area, different eligible costs, smaller number of practices). For the latter, it is however sufficient to demonstrate that incentives through the CRCF create more sustainability co-benefits while the type of practice can be the same. **These multi-layered exceptions create an enabling environment for adverse selection in the type of activities that will apply for registration under the CRCF.** Not having to conduct a financial viability test provides a competitive advantage for activities that already receive public subsidies. This bears substantial risks that CRCF revenues replace public subsidies in already on-going activities instead of incentivising new activities. This will only result in additional climate action if these subsidies in turn are appropriated to additional activities that increase carbon removals in agricultural soils or reduce the emissions from such soils. If they are returned to state budgets and appropriated for other purposes, CRCF funding will not lead to any additional carbon farming activities on agricultural land.

  Finally, the methodology requires that activities must not start before the time of submission of the activity plan to the certification scheme for the certification audit. This would be a very robust rule for ensuring that only those activities will receive CRCF funding that need its incentive effect (prior consideration). The methodology allows however an exemption for any activities that started between 1 January 2023 and 31 December 2027. These "early movers" would be eligible to apply for certification under the CRCF until 2030. Considering that the CRCF regulation only entered into force on 26 December

2024, this exemption would allow registration of legacy actions that already successfully operated before the CRCF has been adopted.

Overall, the additionality rules should be revised and aligned with best practices of existing carbon crediting programmes.

- **No attribution of units incentivised by public funding:** The eligible mitigation activities may also be funded through public funding. If mitigation activities receive both public subsidies and CRCF units, this could artificially lower CRCF unit prices and implicitly subsidise continued fossil fuel use by the buyers of the units. The methodology should either exclude mitigation activities that receive public funding or proportionally attribute the emission reductions to the financial support provided.
- **References to "onboarding" of existing certification schemes should be deleted from the methodology:** In its additionality provisions, the methodology stipulates that activities carried out under other certification schemes than the CRCF automatically meet the prior consideration requirements discussed in the above bullet. However, only units issued after an official recognition of that scheme by the Commission will be eligible for certification. We recommend deleting these provisions from the methodology. There should be a separate delegated act, which will outline the detailed rules for transferring an activity from another certification scheme to the CRCF. These rules should be the same for all project types and there is no need to have such rules included in a methodology for an individual project type. Further, assuming that these activities automatically meet the prior consideration (or incentive effect) provisions of the methodology might be misguided. If the other certification scheme did not require operators to demonstrate that they meet these requirements, this might not be the case.
- **Provisions on storage, monitoring and liability (section 4) are underdeveloped and miss critical provisions**:

  The CRCF Regulation defines that carbon farming sequestration units are temporary and expire at the end of the monitoring period of the relevant activity. However, there are no provisions on the consequences of the expiry of units that were already used. Provisions are needed to clarify that buyers bear the responsibility for replacing temporary units upon their expiry. If the temporary units had been used by a buyer before their expiry, after the expiry the carbon removals associated with these units may not be stored in soils or biomass anymore. This would undermine the environmental integrity of the CRCF because it would lead to higher levels of emissions in the atmosphere than without the use of the mechanism. Alternatively, the methodology should clarify for which limited purposes temporary units may be used, excluding meeting emission reduction obligations by public and private actors.

  Carbon removals and reduced CO_2 emissions achieved through carbon farming activities on mineral soils are of temporary nature and can be reversed quickly. As a consequence, the activities need to be continuously maintained in order to ensure a longer-term mitigation benefit. Yet, the amount of additional removals that can be generated through maintaining an activity that increases carbon removals in soils beyond the proposed activity period is limited as soils reach a level of saturation at some point at which they can no longer store additional carbon. **Incentives to maintain carbon farming activities that enhance carbon removals or reduce emissions from soils and extend the monitoring period as required by recital 13 of the CRCF Regulation are missing in the draft methodology.** Under the CDM, temporary certificates expired after a certain time period. Yet, they could be renewed and upon renewal, credits were issued

for the cumulative mitigation impact achieved in previous crediting periods. This would be an option to account for efforts to maintain achieved carbon removals that would otherwise be reversed by continuing an eligible agricultural activity. If such an approach was followed, a maximum time period for renewing the certification period would need to be defined.

Furthermore, **it is not specified for soil emission reduction units whether they are considered permanent or temporary**. Avoided CO_2 emissions from mineral soils are associated with non-permanence risks and can be reversed. **For avoided CO_2 emissions appropriate liability mechanisms are missing and must be added.** Such non-permanent emission reductions should be treated separately from avoided N_2O emissions from changing fertilising practices and nitrogen management. In contrast to avoided CO_2 emissions, avoided N_2O may be considered to be permanent as they are not related to a GHG reservoir and do not result in increased storage of these gases so that achieved emission reductions are not reversible.

Also, the consequences of no submission of monitoring reports during the monitoring period should be defined in the methodology.

Furthermore, **clarification is needed regarding the provisions on risk assessment (section 4.1).** Provisions should be added to exclude activities from eligibility for which the assessed risk of reversal is very high. Also, the proposed risk assessment does not include an assessment of avoidable risks which should be added. Additionally, operators should be required to undertake measures to mitigate the risk of reversals.

Regarding the implementation of liability (section 4.2), **provisions are missing on how operators will be held liable for replenishing the buffer pool in case of avoidable reversals** (e.g. that no further units will be issued to an operator before the buffer pool has been replenished and that units issued will be cancelled if such replenishment is not implemented).

- **It remains unclear how fulfilment with sustainability requirements (section 5) will be ensured**: Provisions are lacking on how compliance with safeguard criteria should be ensured and how monitoring of environmental impacts should be implemented. It is unclear how the listed requirements will be operationalised as there is no standardised process prescribed (i.e. an environmental and social impact assessment or similar).
- **We recommend shorter activity periods than currently proposed in the draft methodology (section 1.2). Additionally, we recommend adding requirements to update the baseline upon renewing an activity period where this is appropriate.** That way, changes in carbon stocks due to weather conditions or other natural processes and new scientific findings related to assumptions on carbon stocks and quantification approaches can be accounted for. Corresponding provisions on renewing the activity period are currently missing.
- **We welcome the replacement of standardised baselines by activity-specific baselines in the draft methodology. Yet, the reference period for determining activity-specific baselines should be longer than three years.** According to the draft methodology, the length of the reference period to determine activity-specific baselines shall not be smaller than three years and may be extended where applicable to the length of the relevant land management cycle (section 2.3 and 2.5). This requirement is too vague as the reference period must be longer if the relevant land management cycle is longer than three years. Yet, also in other cases, the reference period should be longer than three years. Firstly, longer reference periods better reflect variation in carbon stocks and

nitrogen availability due to climate change impacts and weather conditions. Additionally, longer reference periods better reflect past agricultural practices and prevent incentives to start an activity period at a point in time at which carbon stocks are particularly low. We also recommend making the monitoring of control sites mandatory under a measure-remeasure approach for quantifying changes in soil organic carbon instead of using a baseline equal to zero (section 2.3). This is important to account for uncertainties and variation in climate stocks due to climate change impacts and weather conditions. Additionally, data gained via monitoring of control sites can be used to improve GHG inventory reporting over time.

- **Phasing out the use of peat or peat containing products:** The draft methodology excludes activities from certification if it applies peat or peat containing products as additional carbon input to the soil. Yet, it provides an exception in the case of peat included in compost or growing media for agroforestry seedlings (section 1.1). While products for commercial horticulture may currently contain peat by default, the exemptions will need to be phased out as peat-free products become available. Such a provision should be included in the methodology.
- **Scope of associated GHG emissions expanded, but no systematic assessment required:** We welcome that the scope of associated GHG emissions to be considered has been expanded to include upstream emissions (section 2.6). However, instead of an exhaustive list of emissions to be considered, the methodology should require a systematic assessment based on life cycle emissions data to account for the full amount of emissions associated with the activity, including upstream emissions. Emission sources and sinks should be included unless their omission is conservative.
- **Nitrification inhibitors:** Using nitrification inhibitors as an eligible activity under the draft methodology could have negative effects on water quality and soil biodiversity and further research on their impacts is required, particularly if applied at large scale. Given the involved risks, the use of nitrification inhibitors is unlikely to comply with the sustainability requirements of the CRCF Regulation. The use of nitrification inhibitors should thus only be eligible for certification if comprehensive environmental impact assessments are available at national level.
- **For activities that use biochar as an organic soil improver, it must be clarified that strict sustainability criteria for biochar need to be applied** (see comments on the draft methodology for biochar).

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Talking Points for: Draft elements for an EU certification methodology on carbon removals and emission reductions through carbon farming under the CRCF

Type of Activity: agriculture and agroforestry on mineral soils

Response by Tani Colbert-Sangree, Greenhouse Gas Management Institute

Reviewed by Katie Goldman, Greenhouse Gas Management Institute

General issues:

- The “Use of this certification methodology” section seeks to merge/align the GHG accounting and report of scope 3 with the CRCF crediting methodologies. Corporate GHG inventorying is an allocational GHG accounting framework that assigns emission sources and sinks to responsible entities over a time series while crediting methodologies employ a consequential GHG accounting framework comparing a project scenario and a counter-factual baseline scenario, that have comparable boundaries, over the crediting period. These two GHG accounting frameworks are like oil and water they do not mix even when decision makers try to force them together, because they have different references of comparison (e.g., the same entity in past years compared to other years, vs the project and baseline scenario over the same timeframe) and differently defined GHG accounting boundaries (e.g., in consequential accounting an emission source that does not change between the project and baseline scenario may be excluded from quantification but this would be very important to include in the boundaries of an allocational GHG inventory). The results from these distinct forms of GHG accounting are not comparable and it is not practical to seek to merge carbon crediting with scope 3 objectives. Doing so would perpetuate and grow the confusion that already exists in this space.
- The terms “carbon removals in mineral soils” (CR) and “LULUCF soil emissions” (LSE) that are used in the quantification methodology need to be more clearly defined. The Definitions section of the methodology state that (paraphrased here) *the scope of these quantities corresponds to the scope as defined in regulation (EU) 2018/841, the LULUCF Regulation*. There may be solid definitions of these terms in the regulation, however, to avoid confusion and ensure credible quantification, the precise technical definitions of terms need to be included in the methodology. It is strongly recommended that the methodology use standard technical terms for the quantification methodology (as opposed to policy-specific terms) such as soil carbon stock change or emissions/removals from the soil organic carbon pool.
- Recognizing the real need to balance practicality with rigor, there needs to be more justification for a baseline of zero, which is proposed on page 9. Establishing a standardized baseline (as is done by setting the baseline equal to zero for these project types) can ease project reporting and documentation, but the determination of the standard baseline should be justified to be conservative.

Additionality

- More flexibility could be considered for projects that start activities expecting to receive revenue via the certification scheme but do not apply before beginning the activities. Proof can be established through investor/loan agreements or communication that explicitly identify carbon credit revenue in order to receive financing to adopt new practices. Other forms of proof could also be considered to establish the expectation of receiving credit revenue. Typically, crediting programs allow activities to be implemented 6-12 months prior to the application/registration of a project activity provided the expectation of credit revenue existed prior to the decision to implement the project and can be established. This flexibility could be extended beyond early movers without adding significant environmental integrity risk.
- “Overcompensation” is not a relevant risk, the risk here is that the credit revenue is not what overcomes the project’s barriers to implementation. The amount of compensation

from credits is irrelevant so long as the anticipated credit revenue is sufficient to have caused the project to occur.

- To meet additionality, it is important that a project:
    - 1) considers credit revenue prior to implementation
    - 2) that credit revenue is required to overcome an implementation barrier or barriers, and
    - 3) that the amount of credit revenue is sufficient to overcome the implementation barrier(s). This is the approach that credit quality ratings initiatives use to assess additionality (e.g., the ICVCM, CCQI, and other's assessment frameworks). It may be beneficial to restructure to better articulate these three vital aspects of proving additionality.

Robust Quantification

- Re: quantification approaches to uncertainty, a conservativeness deduction should be specified that corresponds to and is proportional to the level of uncertainty (e.g., an equation for calculating a conservativeness deduction based on the level of uncertainty). The language is currently vague in describing that there is a tradeoff between conservativeness and the level of uncertainty, and that if developers reduce uncertainty with their choice of methods, they can therefore reduce the conservativeness deduction. This should be made clearer.
- Given the number of different project types that may be allowed to apply the methodology and their different pools and emission sources (or varying levels of significance of different pools and emission sources between types) it would strengthen the methodology to develop a matrix of project types (e.g., N2O reduction, agroforestry, livestock grazing, crop production changes, etc.) that identifies which of the pools and sources are significant and therefore required for each of the project types permitted by the methodology. Similar types of projects, e.g., crop production changes could be broadly defined to allow farming practices to be included without a comprehensive list.
- Re: quantification approach 1 and 2, a 70% value for the model's predictive interval and the confidence interval respectively, is a lower standard of accuracy/confidence than is typical for other crediting methodologies. 90% confidence interval is most typical. More rigorous confidence intervals (i.e., 90%) are important to manage the risk of over-crediting projects and to reduce the level of overall uncertainty.
- Re: GHG associated emissions, multiple project types are included in this methodology and the leakage considerations identified in this section only relate to crop or grass production. For example, if livestock grazing intensity is reduced due to changes to grassland management of grazing lands as a result of project activities, the methodology would currently not account for the risk of leakage resulting from additional grazing occurring on grasslands outside the project area as a result of the project, i.e., the possibly displaced livestock activities (or market response in relation to this activity). Eligibility requirements could be added to limit the eligible activities to those that are less likely to result in leakage effects or leakage considerations could be added for a fuller set of the potential projects eligible to implement the methodology.
- The purpose of the "allocation of GHG associated" is not clear and may pose a risk of not adequately accounting for the risk of reversals. Emission sources and sinks, project

emissions and enhanced removals can both exist and be quantified. The risk with subtracting from the amount of enhanced removals that the activities accomplish is that then the obligation to maintain the full amount of enhanced removal over the permanence period, from reentering the atmosphere is lowered (i.e., the full amount removed is not subject to this permanence requirement) and then it would not functionally be countering project emissions ("GHG associated") as this "allocation" implies.

Permanence

- The monitoring period should have a longer minimum period associated with it, given that monitoring is the mechanism used to confirm the permanence of enhanced removals accomplished through the project. It is best practice among carbon crediting programs to monitor a project for at least 100 years from the start of the initial crediting period.[1] Perhaps the requirements for monitoring frequency after the crediting period could be reduced to lower the burden or could be required to be more rigorous for certain activities with higher risk of reversal (e.g., tillage changes that would be reversed if tillage returns to the baseline practice)? Also, it should be noted that 100 years is already a substantial compromise compared to a truly "permanent" removal of emissions (meaning one that lasts forever). While this is the best practice among carbon crediting programs, if the intention of the CRCF Regulation of the European Parliament and of the Council is to ensure permanence as stated in provision (13) "***Permanent*** carbon ***removals*** provide enough certainties on the very long-term duration of several centuries" then the monitoring period should be aligned with this objective and extend beyond 100 years to ensure very long-term storage of carbon over several centuries.

Auditing

- Different auditing requirement ("certification periods") may be appropriate for different project types applying the methodology, e.g., for agroforestry. Agroforestry may warrant allowance to skip the initial verification after 5 years as tree growth can occur slowly and auditing costs can be significant.

[1] See page 77 of the CCQI Assessment Methodology: https://carboncreditquality.org/download/Methodology/CCQI%20Methodology%20-%20Version%203.0.pdf

(carbon)plan

Carbon Market Watch CRCF Review — Soil Carbon + Agro-forestry

This is a summary of questions and observations from a preliminary analysis of the revised draft elements for a EU certification methodology on carbon removals and soil emission reductions through carbon farming under the CRCF Regulation resulting from soil carbon in mineral soils and agro-forestry (hereinafter, “Draft Elements”).

This memo has three parts. First, we describe significant concerns with how the Draft Elements quantify soil organic carbon. Second, we provide a more holistic discussion of outstanding issues, all of which we feel are important. Third, we respond to the guiding questions for discussion provided in the agenda for the Carbon Removals Expert Group.

Lack of Robust Soil Measurements

Robust measurements of changes in soil organic carbon are a necessary guardrail to prevent over-crediting under crediting schemes implemented under the Draft Elements. Measurements provide a source of truth, based on actual observed changes in field-level soil organic carbon. Those measurements provide an important stopgap for curtailing errors that might arise from various modeling choices (Quantification Approach 1), as well as various forms of parcel and project aggregation.

The Draft Elements, as currently written, do not reflect well-established best practices for quantifying changes in soil organic carbon. A robust measurement regime should: account for changes in bulk density; sample beyond 30 cm; and require more than one measurement per sample unit, even when using stratified sampling.

First, the Draft Elements do not require measuring changes in soil bulk density — a measure of the total mass of soil within a fixed volume. As drafted, the Draft Elements state that “[o]perators may use the same bulk density value used for the initial SOC stock to calculate the SOC stock at the subsequent recertification audits.”[1] Allowing operators to forego bulk density measurements risks significant over-crediting. That’s because many approaches for increasing soil organic carbon, such as reduced or no-till agriculture, result in changes in the density of

[1] Draft Elements at page 20.

soil. This becomes a problem when operators use fixed depth sampling — measuring to a pre-set depth (e.g., 30 cm under the Draft Elements). Measurements with a fixed sampling depth have a constant volume. If volume across measurements remains constant, but the density of soil changes, it means that measurements across time will likely contain different total amounts of soil and, as a consequence, carbon. Failure to account for changes in bulk density could result in crediting changes in carbon that are caused simply by the arrangement of the soil itself — as opposed to being caused by an actual increase in the total amount of carbon stored. In other words, failure to account for changes in bulk density can cause crediting of a measurement artifact, as opposed to real, additional carbon storage.

Measurement artifacts related to bulk density are well-studied within the soil carbon literature and many techniques exist to account for and avoid these sorts of problems.[2] If the Draft Elements hope to credit only real changes in soil carbon, it is essential that repeat measurements account for changes in bulk density.

Second, the Draft Elements only require measurements to a depth of 30 cm. This also introduces the possibility of crediting the rearrangement of soil carbon, as opposed to real carbon accumulation. Changes in soil management can trigger gains and losses of soil organic carbon throughout the entire soil column that extend well beyond 30 cm. If carbon rapidly accumulates in the upper layers, but is simultaneously lost in the lower layers, shallow measurements can systematically overestimate the accumulation of soil organic carbon. Again, this is a well-studied phenomenon and can easily be avoided by requiring deeper samples.[3]

Third, the option to use stratified random sampling should require that all samples, whether made as part of a stratified sampling protocol or a conventional sampling protocol, be made up of at least 15 sub-samples per sampling unit. As currently written, operators have two options for measuring fields: a conventional approach and a stratified approach.[4] When using the conventional approach, operators must take a composite sample comprising 15 sub-samples i) per every 5 hectares or ii) per field. However, when using stratified sampling, the Draft Elements do not require any sort of sub-sampling. This is a problem because soil organic carbon is

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2 John W. Wendt and Stefan Hauser, An equivalent soil mass procedure for monitoring soil organic carbon in multiple soil layers. *European Journal of Soil Science*, 64: 58-65. (Jan. 21, 2013) (arguing that "Soil carbon stocks are commonly quantified at fixed depths as the product of soil bulk density, depth and organic carbon (OC) concentration. However, this method systematically overestimates OC stocks in treatments with greater bulk densities such as minimum tillage, exaggerating their benefits.").

3 *See* Erik W. Slessarev et al., Depth matters for soil carbon accounting, *CarbonPlan* (Jun. 17, 2021) (describing how "[a]fter conversion to no-till, the density of the plow layer increases, shifting the soil surface downwards slightly. If the same volume (or depth) of soil is then collected, soil particles that would have been left out before are now included, leading to a larger carbon stock estimate.") and references therein.

4 Draft Elements at page 18.

highly heterogeneous at local scales.[5] An errant rock, root, or any myriad of other small-scale processes can affect soil organic carbon estimates. To address this inevitability, the Draft Elements should require all samples to consist of multiple subsamples within the specified sampling unit.

Other notable observations

01 — Duration of the minimum monitoring period is anomalously short

The revised Draft Elements now require a minimum fifteen year storage period for soil carbon projects — a ten year activity period, followed by an additional five year monitoring period. This is a short period of time to store carbon and is insufficient if the hope is to use the resulting credits to support offsetting claims. However, the new requirement is five years longer than the previous version of the Draft Elements, which is a positive change that should be preserved. Even 15 years is a short carbon storage period compared to the expectations for the vast majority of carbon storage projects that currently participate in the global carbon market. And critically, several parts of the carbon market have rejected efforts to substantially shorten the duration of carbon storage.[6]

02 — Draft Elements still do not account for regional common practice

The revised Draft Elements nominally require consideration of regional common practice.[7] However, the Draft Elements seem to assert that all carbon farming activities automatically satisfy its proposed common practice test. Specifically, the Draft Elements assert that: “In the light of the financial constraints affecting uptake of carbon farming activities [...] the common practice test is considered complied with under the current market conditions.”[8] Such language should be removed. Instead, operators should be required to demonstrate how their project activity goes above and beyond current market trends to promote the adoption of carbon-friendly agricultural practices.

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5 Eric W. Slessarev, Allegra Mayer, Courtland Kelly, Katerina Georgiou, Jennifer Pett-Ridge, and Erin E. Nuccio, Initial soil organic carbon stocks govern changes in soil carbon: Reality or artifact? *Global Change Biology*, 29: 1239-1247 (2023) (Stating that “Increasing the number of replicate soil samples taken at a site will reduce this variation, but can never eliminate it completely.”)

6 Verra, Verra Defers Updates to the VCS Program (Jun. 22, 2022)) (describing Verra’s decision to “not move forward with incorporating tonne-year accounting into the VCS Program at this time”).

7 Draft Elements at page 34.

8 *Ibid.*

03 — Do not allow zero baselines

The Draft Elements allow projects using measure-remeasure techniques to adopt a zero baseline.[9] Such an assumption asserts that all carbon gains are additional and constitute real climate benefits. Imagine there are regions where agricultural practices have steadily been changing in such a way that has long been promoting increases in soil organic carbon. If a project operator were to identify such a region, they could rapidly enroll parcels for a guaranteed return on investment and without requiring any changes in on-the-ground management. This should not be allowed.

04 — Provide details about how the Draft Elements will handle insolvency of carbon insurance products

The Draft Elements allow operators to use private, third-party insurance products to ensure the durability of project activities.[10] It is worth noting that such insurance products are a relatively new phenomenon and have not found widespread usage within the global carbon market. Given their newness, the Draft Elements should spell out what will happen in the event that an insurance provider goes bankrupt or is otherwise unable to replace lost carbon units.

05 — All Tier 3 models should provide details on calibration

The Draft Elements exempt Tier 3 models from providing details about model calibration so long as the model is i) used in the national GHG inventory of a member state or ii) on a list of approved models maintained by the European Commission.[11] Given that most operators are likely to use different calibrations of those models, those calibration steps should be described in the monitoring report. In other words, the Draft Elements should only exempt approved models from disclosing “points (i) and (iii)”, as opposed to “points (i) to (iii)” as currently drafted.

06 — Draft Elements should require re-measurement of 20 percent of sampling points under Quantification Approach 1

The Draft Elements require remeasurement of *in situ* carbon stocks under Quantification Approach 1.[12] As currently drafted, the Draft Elements contemplate two levels of remeasurement: 10 percent or 20 percent of sampling points used for the initialisation of the model. These measurements are an essential guardrail to prevent over-crediting under the Draft

[9] Draft Elements at page 9.
[10] Draft Elements at page 37.
[11] Draft Elements at page 44.
[12] Draft Elements at page 17.

Elements. As such, the Draft Elements should require sampling 20 percent of sampling points to better ensure credited outcomes reflect real climate benefits.

Reply to topics posed in meeting agenda

01 — Length of activity period

As noted above, there is little precedent within the global carbon market of crediting carbon storage for a mere fifteen years (Option 0; 10 year activity period, with a required five additional years of monitoring). If credits under the CRCF will be used to make offsetting claims, then longer activity periods come closer to physically counteracting the impacts of fossil emissions. However, any storage period shorter than the atmospheric lifetime of CO_2 is inappropriate for making offsetting claims. Shorter storage durations might be acceptable in a world where all offsetting claims on the basis of short-duration CRCF credits are prohibited.

02 — Parcel-level vs farm-level monitoring

As noted in the agenda, Option 1 has the distinct advantage of allowing the program to defend against the risk of internal leakage. As such, we would advocate for Option 1.

03 — Measure-remeasure baseline

As noted above, adopting a zero baseline comes with significant risks of over-crediting. As a consequence, Option 1 provides the best option for minimizing over-crediting. It is worth pointing out that various statistical techniques, including synthetic controls, might allow establishing a baseline that does not require that individual operators maintain a set of control sites. However, the logistics involved in implementing such an approach likely fall outside the scope of the current conversation around finalizing the Draft Elements.

04 — Role of the European Commission and MS national authorities

We have no comment to provide.

05 — Group auditing

I have not run across a program that allows groups of operators to join together for monitoring purposes. The sampling strategy, which requires that only the square root of the number of group members be audited per audit cycle, will dramatically lower the number of audits. For

example, if 100 operators band together, under the proposed rules only 10 would be audited per cycle — a 90 percent reduction. Under our reading of the Draft Elements, audits trigger remeasurement of soil organic carbon stocks. This raises concerns that group audits could result in long periods of time between measurements of *in situ* carbon stocks. One way to address this concern would be to require that all operators, regardless of how they are grouped, undergo some minimum number of audits (e.g., one or more) during their combined activity and monitoring periods.

Furthermore, the rules seem to suggest (point 6) that only the group manager would be subject to an on-site audit. All other group members receive desk-based audits. It is not immediately obvious why audits of the group manager should be treated differently. Instead, all group members should be subject to on-site monitoring.