

Terms of Reference (ToR)

Independent External Technical Review

Methodology: BCR0017 – Soil Carbon Removal through Agricultural Management and Mineral Weathering Draft for Public Consultation.

1. Background

BioCarbon Cer has developed the methodology BCR0017 – Soil Carbon Removal through Agricultural Management and Mineral Weathering (Draft for public consultation), currently under public consultation. The consultation documents are publicly available at:

<https://biocarbonstandard.com/en/public-consultation/>

This methodology establishes a framework for quantifying net carbon dioxide removals associated with SOC enhancement, SIC formation, and mineral weathering processes in managed agricultural systems. It applies to managed agricultural soil in which project activities lead to one or both of the following pathways: enhancement of soil organic carbon (SOC) stocks and formation or accumulation of soil inorganic carbon (SIC), including SIC associated with mineral weathering processes.

Under this methodology, eligible project intervention may include, among others, application of silicate minerals, biological inputs, microbial inoculants, enzymes, organic amendments, soil management interventions, restoration of degraded agricultural soils and integrated soil management systems. Practices, inputs, products, and technologies are not credited as such. Credits may be issued only for quantified and verified net carbon dioxide removals stored in eligible SOC and/or SIC pools.

A project activity shall not apply this methodology where it only implements general agricultural land management or improved agricultural practices without demonstrating quantified and verified net carbon dioxide removals in eligible SOC and/or SIC pools in accordance with the methodology. This methodology excludes, among other activities, biochar production or application, forest management, blue carbon, geological carbon storage and activities that only improve agricultural productivity, soil fertility, or soil health without quantified and verified net carbon dioxide removals.

In accordance with the BioCarbon methodological governance framework and international best practices, the methodology is subject to an independent external technical review.

This review aims to ensure methodological robustness, transparency, and alignment with high-integrity carbon market principles, including conservativeness, avoidance of over-crediting, additionality, permanence, leakage management, and avoidance of double counting.

2. Objective of the Review

The objective of the independent external review is to assess whether the methodology:

- (a) Ensures environmental integrity and the conservative estimation of net carbon dioxide removals stored in eligible SOC and/or SIC pools, after accounting for project emissions, leakage, uncertainty, reversals, reserve contributions, and any other applicable deductions;
- (b) Avoids systematic overestimation of mitigation outcomes;
- (c) Applies scientifically robust and auditable quantification approaches for soil organic carbon (SOC) enhancement, soil inorganic carbon (SIC) formation and mineral weathering processes in managed agricultural soils;
- (d) Establishes appropriate separate accounting requirements for SOC and SIC, recognizing their different formation mechanisms;
- (e) Adequately addresses baseline plausibility, separate pool accounting, additionality, monitoring, leakage, uncertainty and permanence in managed agricultural soil contexts;
- (f) Ensures that project activities applying this methodology are distinct from general agricultural land management activities;
- (g) Is consistent with IPCC AFOLU guidance and good practice for soil carbon and anthropogenic removals;
- (h) Is consistent, where applicable, with relevant high-integrity carbon market principles, including the ICVCM Core Carbon Principles and relevant Article 6 accounting requirements.

The review shall explicitly assess whether the methodology provides a credible, conservative, and auditable framework for quantifying net carbon dioxide removals in managed agricultural systems characterized by variability in management practices, soil conditions, climate, agricultural landscapes, and SOC and/or SIC measurement uncertainty.

3. Scope of Work

The external reviewer shall assess at a minimum:

(a) Applicability and Eligibility

- (i) Clarity and enforceability of applicability conditions;
- (ii) Adequacy of eligibility requirements for agricultural land management systems and mineral soils;
- (iii) Consistency with AFOLU accounting principles;
- (iv) Adequacy requirements applicable to mineral amendments.

(b) Baseline and Additionality

The reviewer shall specifically assess:

- (i) Robustness of the baseline approach, including the treatment of the baseline as a dynamic agricultural management system, established separately for soil organic carbon (SOC) and soil inorganic carbon (SIC);
- (ii) Adequacy of the methods used to reconstruct baseline conditions;
- (iii) Treatment of baseline emissions and removals, including soil organic carbon under baseline conditions, the justification of any static SOC or SIC baseline assumption, and the treatment of baseline mineral weathering and background carbonate formation;
- (iv) Treatment of proxy data, regional datasets, and conservative assumptions;
- (v) Consistency between baseline assumptions and additionality demonstration;
- (vi) Application of the BioCarbon Baseline and Additionality Tool;
- (vii) Treatment of regulatory surplus, common practice, and barrier analysis and/or investment analysis;
- (viii) Additionality treatment for small-scale project activities applying simplified BAT provisions;
- (ix) Adequacy of safeguards against non-additional crediting.

(c) Quantification Approach

- (i) Scientific validity of the stock-difference method applied to soil organic carbon (SOC);
- (ii) Scientific validity of quantification methods for direct and indirect nitrous oxide emissions from managed soils;

- (iii) Scientific validity of methane quantification where relevant;
- (iv) Adequacy of the treatment of soil inorganic carbon (SIC) removals;
- (v) Consistency between baseline and project scenario quantification for both SOC and SIC;
- (vi) Adequacy of the integrated net GHG accounting approach;
- (vii) Application of conservative assumptions and parameters;
- (viii) Consistency of emission factors, activity data, and conversion factors with IPCC guidance.

(d) Stratification, Sampling, and Representativeness

- (i) Adequacy of stratification requirements for heterogeneous agricultural systems;
- (ii) Statistical robustness of sampling design;
- (iii) Representativeness of sampling across strata;
- (iv) Adequacy of requirements for justifying and documenting any change to stratification or sampling design;
- (v) Consistency between sampling requirements and uncertainty management provisions;
- (vi) Adequacy of SOC and SIC sampling requirements, including depth, bulk density, coarse fragment content, laboratory analytical methods, and monitoring frequency.

(e) Uncertainty and Conservativeness

Treatment of uncertainty, including:

- (i) Measurement uncertainty associated with laboratory analysis of SOC and SIC concentrations;
- (ii) Sampling uncertainty;
- (iii) Uncertainty associated with SOC and SIC stock estimation;
- (iv) Uncertainty associated with N₂O and CH₄ quantification, mineral weathering fraction estimation, SIC attribution, and model-based estimates;
- (v) Application of the BioCarbon Conservative Approach and Uncertainty Management Tool;
- (vi) Adequacy of conservative deductions and adjustments;
- (vii) Safeguards to prevent over-crediting.
- (viii) Adequacy of conservative procedures for missing, incomplete, inconsistent, or non-verifiable data.

(f) Leakage

- (i) Identification of leakage sources relevant to agricultural systems, including carbon stock losses in input source areas, displacement of existing input uses, displaced agricultural production, and market leakage;
- (ii) Adequacy of leakage quantification and conservative treatment;
- (iii) Consistency with the BioCarbon Leakage Management Tool;
- (iv) Integration of leakage into net GHG accounting;
- (v) Adequacy of provisions for monitoring leakage sources and the data used to quantify leakage.

(g) Permanence and Reversal Risk

- (i) Identification and classification of reversal risks affecting SOC and, separately, SIC;
- (ii) Application of the BioCarbon Permanence and Risk Management Tool;
- (iii) Adequacy of reserve contribution and other applicable risk-management mechanisms;
- (iv) Treatment of reversal detection, monitoring, reporting, and compensation;
- (v) Adequacy of long-term integrity provisions for credited removals in agricultural management systems.

(h) Avoidance of Double Counting

- (i) Consistency with national accounting frameworks;
- (ii) Alignment with Article 6 requirements;
- (iii) Application of exclusive claims, traceability, and avoidance of double counting principles.
- (iv) Application of traceability principles, including chain-of-custody records for mineral, biological, and organic inputs, to support exclusivity of claimed removals.

(i) MRV and Data Integrity

- (i) Robustness of the MRV framework;
- (ii) Adequacy of the monitoring frequencies established for each category of data and parameter, including continuous or at least annual monitoring of activity data, input records, land-management data, and

- project implementation records, and the separate frequency requirements applicable to SOC and SIC stock measurements;
- (iii) Adequacy of data management, traceability, and documentation provisions;
 - (iv) Suitability of QA/QC requirements;
 - (v) Consistency between monitored parameters and quantification equations applied for SOC, SIC, project emissions, leakage, and uncertainty;
 - (vi) Adequacy of verification requirements and competence expectations for validation and verification personnel.

(j) Transparency and Replicability

- (i) Clarity and completeness of methodological steps across quantification, monitoring, and permanence provisions;
- (ii) Transparency of assumptions and parameters;
- (iii) Internal consistency across sections;
- (iv) Replicability across comparable agricultural systems and contexts.

4. Deliverables

The external reviewer shall provide:

- (i) A written independent technical review report;
- (ii) Identification of material methodological risks, if any;
- (iii) Clear, structured recommendations for improvement;

An overall conclusion regarding:

- (i) methodological robustness;
- (ii) environmental integrity; and
- (iii) suitability for application in high-integrity carbon markets.

The report shall clearly distinguish between:

- (i) critical issues (affecting integrity or credibility); and
- (ii) advisory recommendations (methodological improvements).

5. Eligibility Requirements for Applicants

Applicants may be individuals or multidisciplinary review teams. Where a team is proposed, a lead reviewer shall be designated and shall assume responsibility

for the coherence and final conclusions of the review. Collectively, the proposed reviewer or review team shall demonstrate sufficient expertise to cover all material technical areas within the scope of work.

Applicants shall demonstrate:

(a) An advanced academic qualification, or equivalent demonstrated professional expertise, in agronomy, soil science, geochemistry, mineralogy, agricultural systems, agroecology, land-use science, GHG accounting, AFOLU, statistics, or another discipline directly relevant to the assignment;

(b) Demonstrated experience in agricultural GHG accounting, soil organic and/or soil inorganic quantification, mineral weathering or carbonate systems, agricultural methodologies, AFOLU methodologies, or related carbon market methodologies; independent review, development, validation, or assessment of GHG methodologies, protocols, standards, or peer-reviewed technical frameworks;

(c) Expertise in one or more of the following areas:

- (i) soil organic carbon measurement and monitoring;
- (ii) soil inorganic carbon (SIC) formation;
- (iii) nitrous oxide emissions from agricultural soils;
- (iv) methane emissions in agricultural systems, where relevant;
- (v) agricultural land management and soil amendment systems;
- (vi) stratification, sampling, and uncertainty analysis;
- (vii) permanence and reversal risk management for soil carbon pools;
- (viii) IPCC AFOLU guidance and project-level GHG accounting;
- (ix) high-integrity carbon market principles, including ICVCM CCPs, CORSIA, and Article 6;
- (x) absence of conflicts of interest.

Applicants shall disclose any past or present involvement in the development of this methodology.

6. Selection Process

BioCarbon shall evaluate proposals through a documented, merit-based process, applying criteria related to:

- (a) Technical competence;

- (b) Relevant sectoral expertise;
- (c) Independence and conflict-of-interest screening;
- (d) Capacity to complete the review within the specified timeline.

7. Independence and Financial Arrangements

To safeguard independence:

- (a) The external reviewer shall not have participated in the development of the methodology;
- (b) The reviewer shall sign a conflict-of-interest declaration;
- (c) All costs associated with the review shall be borne exclusively by BioCarbon.

8. Timeline

The external review is expected to be completed within two (2) weeks from contract signature.