Publication Date:
13/11/2025

Methodology:
M002

Version:
v1.0

Contact:
Equitable Earth
info@eq-earth.com

Core Document

Methodology for Terrestrial Forest Conservation

Summary

This methodology sets out the criteria, requirements, and procedures for certifying terrestrial forest conservation projects that avoid unplanned deforestation and degradation. It includes the principles and methods for establishing centrally determined, jurisdictionally nested baselines derived from Jurisdictional Reference Levels (JRLs) using a model to forecast biomass stock changes and allocate project-level baselines proportionally to predicted losses; demonstrating additionality; quantifying net greenhouse gas (GHG) emission reductions; and meeting monitoring and reporting requirements.

Acknowledgements

This methodology was developed by Equitable Earth with significant contributions from the Equitable Earth Coalition, including James G.C. Ball, PhD, Simon Bird, Emily Dangremond, PhD, Jeremy Freund, Will Gochberg, PhD, Vincent Haller, Lawson Henderson, Mike Korchinsky, and Maren Pauly, PhD.

The first versions of this methodology and its supporting programme were guided by and co-designed with governments, scientists, technical experts, and Indigenous Peoples and Local Community leaders.

Table of Contents

1 Introduction

1.1 Normative References

This document must be read in conjunction with the following documents:

- Equitable Earth Standard
- Programme Manual
- Validation and Verification Procedure
- Registry Procedures
- Standard Setting and Methodology Development Procedure
- Terms & Definitions

1.2 Reading Notes

Several sections in this document are divided into Principles and Methods as follows:

- Principles set out the requirements applying to each of the three pillars.
- Methods elaborate on how developers and Equitable Earth must apply these requirements.

See the *Reading Notes* section in the Programme Manual for additional information.

2 Eligibility Criteria

Projects are eligible to apply this methodology if they meet the criteria set out in this section.

2.1 Scope

This methodology includes carbon accounting and crediting estimation for Avoided Unplanned Deforestation and Degradation (AUDD) activities within the project area.

2.1.1 Developers must implement targeted activities to address the root causes of deforestation and degradation, including but not limited to:

1) **Exclusion of deforestation and degrading practices:** prohibition of activities such as harvesting and logging of timber within the project area, and implementation of controls to reduce access, where feasible

2) **Community-based sustainable practices:** collaboration with communities to encourage sustainable resource use and alternative livelihoods

2.2 Nesting

2.2.1 Projects must use an AUDD baseline, allocated via a risk map from a Jurisdictional Reference Level (JRL) provided by Equitable Earth. Standalone (non-nested) AUDD baselines cannot be applied under this version of M002.

2.2.2 The JRL must be validated by an independent expert panel in accordance with the Jurisdictional Baseline Validation Methodology (forthcoming).

2.3 Land Status

2.3.1 To be eligible for Equitable Carbon Unit (ECU) crediting, the project crediting area must have met the Equitable Earth definition of forest[1] at the project start date and for the 10 years prior. Equitable Earth determines this by applying a forest mask within the project area and comparing the Above-Ground Biomass (AGB) value per pixel over the 10 years preceding the

[1] Under this methodology, Equitable Earth uses a forest definition adapted from FAO, which defines forest as land spanning more than 0.5 hectares with a canopy cover of more than 10 percent. Adapted from Global Forest Resources Assessment 2020, Terms and Definitions, Working Paper, Rome: FAO, 2018. Developers may submit requests to use the relevant national definition of forest, which will be considered and applied on a case-by-case basis. Note that certification times may be longer for projects using alternative forest definitions.

project start date against the reference values established by the AGB provider.[2]

2.3.2 Projects must be located within at least one clearly defined jurisdiction at the sub-national level (e.g., state, province, region, department, district). Where there are geographic constraints applying a sub-national jurisdiction, developers may use additional definitions in line with Equitable Earth's jurisdiction definition. Refer to the Terms & Definitions document for more details.

2.3.3 Projects may be developed on public, private, communal, or mixed lands and territories, including those owned and/or managed by Indigenous Peoples (IPs) and Local Communities (LCs).

Public lands that are contested by IPs and/or LCs, have rights-of-way, or hold cultural significance for IPs and LCs are subject to the requirements set out in the Equitable Earth Standard.

2.3.4 Projects may be developed within or outside protected areas, considering the following:

1) **Within protected areas:** includes areas designated under any management category (Ia–VI) and governed under any recognised governance type (e.g., government, shared, private), as established by the International Union for Conservation of Nature (IUCN).[3]

2) **Outside protected areas:** includes non-protected lands or territories under any governance type..

2.3.5 Projects located in mangrove or other marine and coastal habitats, as classified by the IUCN, are not eligible under this version of the methodology.

2.3.6 Avoided emissions from the rewetting of peat soils and from the conservation of peat from unplanned conversion are not eligible under this version of the methodology.

2.3.7 Monoculture forest plantations are not eligible for crediting under this methodology, even if classified as forest.

[2] Equitable Earth conducted a comprehensive benchmarking exercise to compare multiple external AGB providers. The objective of this assessment was to select the provider best suited to deliver rigorous, conservative, and accurate AGB data for calculating GHG reductions and removals. Based on this process, Chloris Geospatial has been selected as the primary AGB provider for this version of the methodology. More information is available on the Equitable Earth website.

[3] Dudley, N. (Ed.) (2008). Guidelines for Applying Protected Area Management Categories. Gland, Switzerland: IUCN.

2.4 Geographic Boundaries

2.4.1 Developers must clearly define the physical boundaries of the project. Refer to the *Geography and Project Boundaries* section in the Equitable Earth Standard for more details.

2.4.2 The project area for AUDD activities may be a combination of forest, non-forest, or converted native ecosystems. However, the project crediting area is limited to forest areas subject to conversion (AUDD) in the baseline scenario.

2.4.3 Any forest areas within the physical boundaries of the project area may not be excluded, except plantation forests. Plantation forests are defined as non-native monocultures or forests intensively managed for timber products, food, or fibre, and are excluded from the baseline and project area.

2.4.4 The size of the project area may be expanded in conformance with the requirements and procedures established by Equitable Earth. Refer to the *Project Expansion* section in the Programme Manual for more details.

2.4.5 Projects of any size are eligible to apply this methodology. No minimum or maximum land area or net GHG reduction capacity is required under this version.

2.5 Temporal Boundaries

2.5.1 Developers must clearly define the temporal boundaries for the project area, specifying the period during which deforestation and degradation impacts are mitigated by project activities and eligible carbon stocks are monitored for reversals.

Refer to the *Key Project Dates and Crediting Period* section in the Equitable Earth Standard for more details on core requirements related to the project start date, project registration date, submission window, and crediting period. Specific requirements for monitoring periods and their frequency are set out in the *Monitoring* section of this methodology.

3 Livelihoods

3.1.1 Developers applying this methodology must demonstrate that their project meets all requirements under the Livelihoods Pillar in the Equitable Earth Standard. This includes requirements related to livelihoods baseline assessment, stakeholder engagement, specifications on engagement with IPs and LCs, including requirements on free, prior, and informed consent (FPIC), social additionality and benefits, as well as social safeguards.

4 Ecological Condition

4.1 Principles

Conservation Interventions

4.1.1 Developers must plan and implement conservation interventions to achieve positive ecological outcomes, minimise risks, adhere to safeguard requirements, and mitigate negative socio-environmental impacts in line with the requirements in the Equitable Earth Standard and this methodology.

4.1.2 Developers must develop interventions that conserve areas identified as high risk of deforestation and/or degradation and those identified as high conservation values (HCVs) within the project area.

4.1.3 Developers must promote local ownership by involving IPs and LCs identified as core and direct project stakeholders in the design and monitoring of ecological condition and conservation interventions, and in data collection processes.

Ecosystem Extent and Connectivity

4.1.4 Developers must demonstrate concrete actions to maintain and increase ecosystem extent and connectivity and mitigate human-made barriers that fragment or hinder connectivity. Actions may include, but are not limited to:

1) Maintaining minimum corridor widths
2) Establishing new corridors (e.g., installation of wildlife crossings, overpasses, underpasses)
3) Establishing or maintaining buffer zones
4) Demonstrating no net habitat loss
5) Removing barriers (e.g., roads, fences)

4.1.5 Developers must assess the impact of and justify the need for new barriers created as a result of project activities.

4.1.6 Developers must strive to limit and mitigate the impacts of infrastructure (e.g., roads, hydroelectric dams) development or land-use changes that reduce connectivity within the project area.

Ecosystem Services

4.1.7 Where IPs and LCs depend on ecosystem services for their livelihoods, developers must ensure access is maintained.

4.1.8 Developers must ensure that access to Non-Timber Forest Products (NTFPs) and their derived benefits is fair, transparent, and non-discriminatory. Particular attention should be paid to vulnerable project stakeholders and IPs and LCs who depend on these resources for their livelihoods.

4.1.9 If forest products are being generated within the project area, developers must provide training to project stakeholders, including any IPs and LCs identified as core and direct project stakeholders, to encourage sustainable management of forest products to reduce deforestation and degradation in the project area.

Ecosystem Threats

4.1.10 Developers must leverage historical data, local expertise, and active engagement with relevant stakeholders, particularly IPs and LCs, to ensure a context-specific understanding of threats and drivers.

4.1.11 Developers must identify where each identified threat applies in the project area.

Anthropogenic Threats

4.1.12 Developers must identify and analyse past and/or current anthropogenic deforestation and degradation drivers (e.g., anthropogenic fires, logging, agricultural expansion), and the stakeholders involved (e.g., local farmers, logging operators), following the requirements in the *Theory of Change* section of the Equitable Earth Standard.

4.1.13 Developers must strive to reduce deforestation and degradation drivers affecting the project area, such as land conversion for agriculture and ranching, infrastructure development, browsing, overgrazing, illegal or unsustainable harvesting, hunting practices, nutrients and chemical runoffs, and proliferation of invasive species.

Natural and Climatic Threats

4.1.14 Developers must identify and strive to manage emergent and recurring natural threats to ecosystem conditions in the project area. This may include, but is

not limited to, invasive species, grazing, uncontrolled fire, soil erosion, flooding, pests, disease, drought, and smothering.

4.1.15 If developers or project stakeholders identify non-native or invasive species in the project area, developers must implement control measures and prevent further spread.

4.1.16 If invasive species are to be removed, developers must detail plans for the proper disposal, focusing on minimising carbon emissions linked to their disposal.

4.2 Methods

Baseline Assessment

4.2.1 Developers must conduct a comprehensive baseline assessment to inform the design of interventions, as outlined in the Equitable Earth Standard. This includes:

1) Field assessment (refer to the *Field Assessment* section for more details)
2) Baseline values for each of the ecological condition indicators selected in the intervention plan
3) Engagement with relevant stakeholders, including IPs and LCs identified as core and direct project stakeholders, to integrate their insights and priorities

4.2.2 Developers must establish an ecological condition baseline for the project area using each of the categories in the table below. Developers are encouraged to monitor multiple indicators and metrics.

Category	Requirement	
Ecosystem characterisation	Developers must provide	Vegetation type
	Developers must provide	Köppen climate classification
	Developers must provide	Mean seasonal rainfall for the previous 10 years
	Developers must provide	Mean seasonal temperature for the previous 10 years

Category	Requirement	
Forest intactness, connectivity, and structure	Developers must provide	Extent of core forest area
	Developers must provide	Map of roads, settlements, infrastructure and other barriers
	Developers must measure and monitor at least one metric	Example metrics may include canopy cover, crown visibility, relative distance between crowns, and canopy height
Ecosystem function, biodiversity and condition	Developers must document	Vegetation strata
	Developers must document	Disturbance type, if observed
	Developers must document	Regeneration, if observed
	Developers must document	Identification and abundance of invasive species
	Developers must measure and monitor at least one metric	Biodiversity. Example metrics may include acoustic richness, species composition, species diversity, functional group, and species abundance
	Developers must measure and monitor at least one metric	Indicator species. Example metrics may include population and occupancy
	Developers must provide	Species categorised by IUCN as critically endangered, endangered, and vulnerable
	Developers must measure and monitor at least one metric	Hydrology and water quality. Example metrics may include turbidity, suspended sediment, nutrients, and contaminants
	Developers must measure and monitor at least one metric	Soil health. Example metrics may include bulk density, soil texture, soil moisture, contaminants, microbial activity, and fauna

Category	Requirement	
Ecosystem threats	Developers must	Provide information on the existing and historic prevalence and scope of identified ecosystem threats (e.g., incidence and severity of fires, invasive species)
	Developers must	Identify and comment on the effectiveness of past and/or ongoing efforts to mitigate or reduce identified threats
Ecosystem services	Developers must	Determine the main land use and ecosystem services derived by any core and direct project stakeholders

4.2.3 Developers must justify the selection of each metric and state why it is representative.

Field Assessment

4.2.4 Developers must design and conduct a field assessment to gather data for the baseline assessment and to monitor performance against project targets, outcomes, and objectives in the project area. Developers must complete the field assessment using the Equitable Earth Certification Platform.

4.2.5 Equitable Earth provides developers with a stratification of the project area, with groups based on:

1) Risk of AGB loss as outlined in the *Carbon Stock and Baseline Estimation* section
2) Biome
3) Distance to forest edge

4.2.6 Developers must identify field assessment sites and justify their selection. Field assessment sites must be selected within:

1) Each group in the stratification provided by Equitable Earth

2) Areas identified by the developer as being at high risk of deforestation and/or degradation

3) Sites that are indicative of performance against project targets, outcomes, or objectives

4.2.7 Developers must repeat the field assessment in the same sites used in the baseline assessment during each adaptive management phase. Developers must also conduct field assessments in additional sites in new areas categorised as high risk and proximal to areas of deforestation.

Intervention Plan

4.2.8 Developers must design interventions in line with the *Theory of Change* section of the Equitable Earth Standard that clearly states how the project plans to achieve its ecological condition targets, outcomes, and objectives and reduce deforestation and degradation.

4.2.9 The interventions must be based on an understanding of the ecological condition in the project area, as identified in the ecological condition baseline assessment, the baseline scenario, the direct and indirect threats, and the causal chain required under the *Theory of Change* section of the Equitable Earth Standard.

4.2.10 Each indicator should be monitored at least annually and must be monitored and reported on at each verification. Monitoring approaches may include remote satellite imagery, field inventories, community-based monitoring, and sensors for continuous monitoring.

4.2.11 Developers must provide details of the monitoring and methods used, such as remote sensing, field assessment, and surveys, in addition to the number, distribution, and location of samples.

4.2.12 The monitoring plan should strive to control for seasonality.

Measurement and Reporting

For more details, refer to the *Monitoring, Reporting, and Verification (MRV)* section of the methodology, and the *Monitoring, Reporting, and Verification (MRV)* and *Theory of Change* sections of the Equitable Earth Standard.

5 Carbon

5.1 Baseline Scenario

Principles

5.1.1 Developers must establish the baseline scenario representing the most plausible land-use trajectory in the absence of the project, consistent with historical trends, applicable legal and policy frameworks, and jurisdictional REDD+ strategies.

5.1.2 Developers must re-evaluate the baseline scenario at the end of the baseline validity period (BVP) to reflect updated deforestation dynamics, changes in relevant government policies, and advances in available data. Refer to the *Baseline Validity and Re-Evaluation* section for more details. Validation of the baseline scenario re-evaluation occurs at the subsequent verification.

Methods

5.1.3 Developers must establish the baseline scenario by identifying and analysing alternative land use scenarios to the proposed project activities in a qualitative assessment.[4]

5.1.4 Developers must re-evaluate the original baseline scenario by assessing the impact of any potential changes to policies or regulations. If no changes affecting the baseline scenario occurred, and the original baseline scenario remains valid, developers must demonstrate as such.

5.2 Additionality

Principles

5.2.1 Developers must demonstrate additionality using a project method, following the steps below:

1) **Regulatory surplus.** Developers must demonstrate that there is no enforced legal obligation to implement the project activities.

[4] This methodology requires developers establish a qualitative baseline scenario, while Equitable Earth sets the quantitative project baseline. Refer to the *AUDD Project Baseline* and *Carbon Quantification* sections for more details on project baseline setting and calculation of baseline emissions, respectively.

2) **Barrier analysis.** Developers must identify existing barriers that would prevent the implementation of project activities in the absence of revenues from ECUs. Developers must, at a minimum, include a financial barrier in the analysis, and may also include other relevant barriers from the list below:

    a) **Financial barriers:** challenges related to insufficient funding, high upfront costs, difficulty accessing finance, and the lack of a clear monetary value for standing forests and sustainable forest products. This includes existing policies and requirements other than legal obligations to lower GHG emissions (e.g., non-mandatory policy incentives and enablers).

    b) **Technical barriers:** challenges related to the application of technology, methodologies, and technical expertise. Barriers may include difficulties in applying established methodologies, managing complex technical tasks, and ensuring accurate measurement and monitoring of key indicators and outcomes, such as carbon sequestration.

    c) **Capacity barriers:** challenges related to education, technical training, and human resources. Barriers may include a lack of skilled personnel or insufficient training in conservation techniques, monitoring protocols, and carbon accounting.

    d) **Logistical barriers:** challenges related to the infrastructure, operational aspects of a project, and labour shortages. Barriers can include poor accessibility to key sites, limited transportation options, inadequate facilities, and the unavailability of necessary materials.

    e) **Cultural and social barriers:** challenges in the collective movement of communities towards implementing, maintaining and monitoring conservation projects due to, for example, lack of information, threats to the safety of community members, and existing social structures and norms.

    f) **Regulatory and institutional barriers:** limitations within the regulatory framework and its relevant institutions, such as limited staff capacity, lack of necessary skills, local regulations, complex permitting processes, ineffective bureaucratic processes, or challenges meeting specific compliance standards.

3) **Common practice assessment:** Developers must demonstrate that activities similar to the project activities are not common practice in the

project's jurisdiction, following the steps set out in the *Methods* section below.

Methods

5.2.2 Both Equitable Earth and the Validation and Verification Body (VVB) must assess the demonstration of additionality and all supporting evidence provided.

Regulatory Surplus

5.2.3 Developers must identify all relevant local, regional, or national legislation, policies, or agreements in force in the project's jurisdiction.

5.2.3.1 For high-income countries, all legal requirements should be deemed enforceable.[5]

5.2.3.2 For countries other than high-income countries, legal requirements should only be deemed non-enforceable based on legal and documented sources relevant to the project activity.

5.2.3.3 Where a legal obligation to undertake conservation activities applies to the project crediting area, developers must indicate and prove exactly where and in what context it applies.

5.2.3.4 Where a legal obligation to implement conservation measures applies to the project crediting area but cannot be fulfilled without the project's funds or technology, developers must prove that barriers exist to establish additionality.

Barrier Analysis

5.2.4 Developers must demonstrate the presence of existing barriers to the implementation of project activities and provide supporting evidence for assessment by Equitable Earth and the VVB. Evidence may include, but is not limited to, the examples outlined below:

1) **Financial barriers:** statements of account, notice of refusal of subsidies, and evidence that alternative land uses are more profitable without carbon credits.

2) **Technical barriers:** lack of tools, records of failed pilot trials.

[5] Refer to the Terms & Definitions document for a full list of high-income countries.

3) **Capacity barriers:** list of staff, job descriptions, expertise and relevant knowledge, access to training and capacity-building resources, training records (or lack thereof).

4) **Logistical barriers:** maps showing remoteness or poor access, transport cost estimates or invoices, and photos of terrain and access routes.

5) **Cultural and social barriers:** stakeholder engagement reports, evidence of past opposition or failed conservation attempts, and records of traditional land use patterns.

6) **Regulatory and institutional barriers:** unclear or restrictive legal frameworks for land use or carbon rights, evidence of policy gaps or lack of institutional support, land tenure records or land registry status, legal reviews of land or forestry laws, and correspondence with authorities showing regulatory delays.

Common Practice Assessment

5.2.5 Developers must demonstrate that the project activities would not be common practice using the following steps:

1) Define the project activities (i.e., avoided emissions from deforestation and degradation).

2) Define the geographic region for the assessment. The geographic region should have a similar policy environment as the project area, and should, at most, align with the national jurisdiction. Where there are sub-national (e.g., regional, local) programmes providing incentives for conservation activities, then the geographic region for assessment should align with them.

3) Identify any activities similar to the project activities that have been implemented previously or are currently underway in the defined geographic region, excluding any activities that are under certification or registered with a voluntary carbon crediting programme. Similar activities are those with comparable conditions (e.g., types of project activities, types of land tenure, types of funding or access to resources, economic or socioeconomic conditions) or circumstances that affect the implementation of the project activity.

4) Compare the project activities to any identified similar activities, describing any distinctions between the project activities and similar activities.

5) Calculate the cumulative adoption rate (%) of any similar activities identified using the following parameters (E.1):

$$A = [1 - (\frac{Ndist}{Nsim})] \times 100 \quad \textbf{(E.1)}$$

Where:

- A = Adoption rate; percentage (%)
- N_{sim} = total number of similar projects identified in the defined geographic region
- N_{dist} = number of similar projects with distinctions from the project activity; N_{dist} must not exceed N_{sim}

6) Using the calculation results, determine whether or not the project activities are common practice, based on the following:

a) Where the adoption rate is below 20%, the project activity is not common practice and is therefore additional.[6]

b) Where the adoption rate is equal to or above 20%, the project activity is common practice and is not additional.

c) Where no similar activities are identified in the defined geographic region (i.e., N_{sim} = 0), the adoption rate must be set to 0%, and the project activity must be considered not common practice.

[6] Equitable Earth established a 20% adoption rate threshold in alignment with the CDM tool to assess common practice.

5.3 Leakage

Principles

5.3.1 Equitable Earth accounts for activity-shifting leakage resulting from deforestation and degradation activities displaced by the implementation of project activities.[7]

5.3.2 Developers must identify and mitigate leakage risks through targeted strategies and activities, designed and implemented throughout the project crediting period.

5.3.3 Equitable Earth may apply additional adjustments in cases where leakage risks are deemed material or not adequately mitigated.

Methods

5.3.4 Equitable Earth pre-defines potential activity-shifting leakage risks to support developers in identifying and mitigating risks.

5.3.5 Developers must evaluate the activity-shifting leakage risks pre-defined by Equitable Earth, document any gaps, develop a mitigation plan for each risk identified, and report on risk mitigation during each monitoring period.

5.3.6 Equitable Earth applies a fixed leakage deduction of 10% to avoided forest-loss emissions to account for activity-shifting leakage.[8] Refer to the *Quantifying Emissions from Activity-Shifting Leakage* section for more details.

5.4 Permanence

Principles

Safeguards

5.4.1 Developers must ensure the permanence of emission reductions by contributing to a shared buffer pool managed by Equitable Earth.

[7] Market leakage is captured in the national JRL and is not quantified separately due to the local nature of displacement; this is consistent with the methodological assumption that leakage due to activity shifting is primarily local.

[8] The 10% factor is a conservative default supported by Equitable Earth's global analysis of REDD+ projects (76 projects; 532 monitoring-years, 2003–2023), which found typical activity-shifting leakage well below 10% across regions and methodologies.

5.4.2 Developers must notify Equitable Earth of any significant loss events within the project crediting area that may trigger reversal classification.

5.4.3 In the conservation plan, developers must outline and justify all project interventions and activities that address anthropogenic, natural, and climate risks. Refer to the *Intervention Plan* section for more details.

5.4.4 Developers must mitigate the risk of unintended fires by preparing a fire prevention and management strategy for the project crediting area, following the requirements set out in the Equitable Earth Standard.

5.4.5 If prescribed fires are included in the conservation plan, developers must mitigate the risk of biomass burning beyond the area designated for the prescribed burn by preparing a fire management strategy for the project crediting area. This strategy must indicate the location of the expected burned area, the reason for burning, and its frequency.

Reversals

5.4.6 All reversal risks must be assessed, monitored, and mitigated. Refer to the *Compensation of Reversals* section in the Programme Manual for more details.

Methods

Risk Assessment & Buffer Pool

5.4.7 Equitable Earth identifies delivery and reversal risks and assesses their likelihood and the severity of their consequences. Refer to the *Risk Assessment* section of the Programme Manual for more details.

5.4.8 Equitable Earth allocates 20% of the verified GHG reductions achieved by each project to the buffer pool at the time of ECU issuance. Refer to the *Buffer Pool* section of the Programme Manual for more details about how buffer pool contributions are managed. Additional details on project-level deductions are in the *Quantifying Net Emission Reductions (NERs)* section of this methodology.

Loss Events

5.4.9 Loss events must be monitored, reported, quantified, and accounted for.

5.4.9.1 Developers must monitor and report on loss events during the project lifetime. Refer to the *Permanence and Reporting* section of the Equitable Earth Standard for more details.

5.4.9.2 **Quantification:** In case of a loss event, Equitable Earth quantifies the GHG emissions associated with the area that experienced the loss event using the following equation (E.2):

$$C_{loss-event} = C_{post-event} - C_{pre-event} \quad \textbf{(E.2)}$$

Where:

- $C_{loss-event}$ = Impact of the loss event; tCO_2e
- $C_{post-event}$ = Carbon stock of the area after the loss event; tCO_2e
- $C_{pre-event}$ = Carbon stock of the area before the loss event; tCO_2e

Reversals

5.4.10 If reversals occur during the project lifetime, ECUs must be compensated through the buffer pool mechanism. Refer to the *Compensation of Reversals* section in the Programme Manual for more details.

6 Project Boundary

The project boundary delimits all carbon pools, emission sinks, and emission sources considered in this methodology.

6.1 Emission Sinks & Sources

6.1.1 Projects are monitored for CO_2 (carbon dioxide) and must include additional GHGs unless they are shown to be *de minimis*. Equitable Earth may only account for the GHG gases specified in the table below.

Gas	Potential Sources
CO_2 (carbon dioxide)	• Flux in carbon pools
CH_4 (methane)	• Burning of biomass • Livestock
N_2O (nitrous oxide)	• Burning of biomass • Livestock • Synthetic fertiliser

6.2 Carbon Pools

6.2.1 Relevant carbon pools included in this methodology are listed in the table below.

Carbon Pool	Type	Inclusion	Justification
Woody biomass	**Above-Ground Biomass (AGB)**	Yes	• Significant carbon pool in REDD+ projects • The primary source of emissions from deforestation and degradation • Measurable with high accuracy using remote sensing
	Below-Ground Biomass (BGB)	Yes	• Significant carbon pool directly related to AGB • Can be robustly estimated using established root-to-shoot ratios • Inclusion ensures a more complete accounting of tree biomass emissions
Non-woody biomass	**Above-ground**	No	• Generally, a minor carbon pool in forest ecosystems relative to woody biomass • High temporal variability and limited impact on overall emission estimates • Project baselines are derived from observed, aggregated biomass changes, in contrast to approaches that rely on a modelled land-use transition counterfactual. Therefore, this pool is excluded
	Below-ground	No	• Typically, a small and variable carbon pool • Limited data availability and

Carbon Pool	Type	Inclusion	Justification
			high measurement uncertainty • Excluded for simplicity in this version
Soil organic carbon (SOC)		No	• Material in some ecosystems, but high measurement uncertainty and monitoring complexity • Excluded for simplicity in this version • Conservation is assumed to be correlated with tree biomass conservation
Dead wood		No	• Can be significant after disturbance events, but variable over time • Monitoring requires additional field data • Excluded for simplicity in this version
Litter		No	• Minor pool in most tropical and subtropical forests • High turnover rate and low overall carbon stock • Excluded for simplicity in this version

7 Monte Carlo Simulation

Principles

Equitable Earth applies a Monte Carlo simulation to propagate pixel-level uncertainty to project- or jurisdiction-level estimations of carbon stock. This method propagates uncertainties from each component and reflects their interactions accurately, providing a robust and comprehensive probabilistic representation of both jurisdictional baselines and removal estimates, along with their corresponding uncertainties.

The Monte Carlo approach used by Equitable Earth involves sampling values at the pixel level from the best-fitting probability density function for the parameter of interest. These sampled values are then aggregated to calculate the overall values for the designated plot.

Methods

Through iterative sampling, the method constructs a comprehensive probability density function, capturing site-level uncertainty with precision. The key steps are outlined in this section.

For each pixel, the value is adjusted based on its associated uncertainty, following the procedure below.

7.1.1 When spatial correlation is required, it is incorporated through a perturbation field defined by equation (E.3):

$$\mathbf{Z}_{total,\,i} = \mathbf{Z}_{global,\,i} \times \sqrt{\varrho} + \mathbf{Z}_{noise,\,i} \times \sqrt{1 - \varrho} \qquad \textbf{(E.3)}$$

Where:

- $\mathbf{Z}_{total,\,i}$ = Perturbation field across the studied area at iteration *i*; dimensionless
- $\mathbf{Z}_{global,\,i}$ = Global shock across the studied area at iteration *i*, identical for all pixels and randomly drawn from a normal distribution with a mean of 0 and a variance of 1; dimensionless

- $\mathbf{Z}_{noise,\,i}$ = Pixel-level independent noise at iteration *i*, independently drawn for each pixel from a normal distribution with a mean of 0 and a variance of 1; dimensionless
- ϱ = Correlation factor between the pixels; dimensionless

7.1.2 The perturbation field created is used to compute the pixel-level value at iteration i, using equation (E.4):

$$\mathbf{V}_{mc,\,i} = \mu + \sigma \times \mathbf{Z}_{total,\,i} \quad \textbf{(E.4)}$$

Where:

- $\mathbf{V}_{mc,\,i}$ = Perturbated value across the studied area at iteration *i*; tDM
- μ = Mean of the best-fitting distribution; dimensionless
- σ = Standard deviation of the best-fitting distribution; dimensionless
- $\mathbf{Z}_{total,\,i}$ = Optional perturbation field across the studied area at iteration *i*; dimensionless

7.1.3 The determined pixel-level values obtained are aggregated to estimate the total value in the specific iteration.

7.1.4 These steps are iterated to build a comprehensive probability distribution of values at the project level. During the iterations, the value stabilises as the simulation progresses. The number of iterations is determined dynamically by monitoring the convergence of both the mean and standard deviation; simulations continue until both statistics stabilise within predefined tolerances.

7.1.5 The resulting distribution represents the range of potential values in the area. The Monte Carlo simulation is used at multiple stages of this methodology, including:

1) Estimation of carbon stock in the project area
2) Estimation of carbon stock for JRL
3) Quantification of carbon stock losses for reversal assessment

8 Carbon Stock and Baseline Estimation

8.1 AUDD Project Baseline

8.1.1 Projects must use a centrally defined and risk-adjusted baseline for AUDD, assigned by Equitable Earth.[9]

8.1.2 Equitable Earth calculates AUDD baselines through a three-step process:

1) Establishment of a JRL
2) Development of a deforestation risk map using a risk model that predicts biomass loss
3) Allocation of the JRL to project areas based on relative risk. Developers are not permitted to submit baseline emissions data or propose alternative baselines

The AUDD baseline represents the gross emissions that would have occurred in the absence of the project and is expressed in tonnes of CO_2 equivalent per year (tCO_2e/year). The total allocation for the project must not exceed the jurisdictional cap.

Additional details on Equitable Earth's centralised baseline setting approach are described in the Baseline Setting Module (forthcoming). This module describes the procedures and methods for allocating baselines for terrestrial AUDD projects. It includes the underlying principles and processes used to design a model-based baseline setting approach to determine jurisdictionally nested, project-level baselines derived from the JRL. The document also details procedures for the development and application of a spatio-temporal model that forecasts biomass stock changes to proportionally allocate baselines to predicted losses, while addressing uncertainty and accuracy.

Jurisdictional Reference Level (JRL)

The JRL is derived from historical forest biomass loss using remote sensing and represents the total historical emissions from deforestation and degradation across a

[9] To ensure conservativeness and avoid perverse incentives, baselines are centrally determined by Equitable Earth using standardised models, and quality-controlled data. The allocation process applies consistent rules across all projects.

defined jurisdiction over a 10-year historical reference period (HRP). The JRL serves as a carbon budget that cannot be exceeded by the sum of individual project baselines within the same jurisdiction.

Risk Mapping

Equitable Earth uses a risk model to develop jurisdiction-wide risk maps that consider both spatial and temporal dimensions. The risk model is trained on historical biomass loss to predict future deforestation risk.

The risk map provides a continuous surface of forecasted AGB change, highlighting areas expected to experience greater biomass loss (interpreted as a higher relative risk of deforestation).

Risk maps are periodically updated and evaluated for accuracy, transparency, and alignment with jurisdictional mitigation objectives.

Baseline Allocation

Project baselines are allocated by overlaying project boundaries onto the jurisdictional risk map. Equitable Earth converts the risk (AGB-change) forecast into an allocation map by scaling pixel-level predicted losses so that the sum of allocated emissions across the jurisdiction exactly equals the JRL. Per-pixel allocations are further constrained by available biomass stock to preserve nesting integrity and prevent over-allocation.

Each project receives a share of the JRL based on the relative deforestation risk of its location, as follows:

1) Higher-risk areas receive a proportionally larger allocation
2) Lower-risk areas receive a smaller allocation

The assigned baseline is provided in units of tCO_2e/year and is:

1) Centrally parameterised by Equitable Earth to ensure methodological consistency
2) Inclusive of any jurisdiction-level discounting, which is passed through to the project allocation

Baseline Validity and Re-Evaluation

8.1.3 Equitable Earth must assign the initial baseline estimation at the feasibility phase, based on an HRP of 10 years that ends within one year of the project start date.

8.1.4 Equitable Earth establishes new AUDD baselines every five years at the end of the BVP to reflect updated deforestation dynamics, model uncertainty, baseline stability, and overall procedural efficiency. The BVP begins on the project start date.

When a new baseline is established, the HRP is extended to incorporate the most recent historical period.

8.1.5 Equitable Earth may develop revised risk maps to allocate baselines based on newly available data, identified errors, and model performance improvements.

8.2 Project Emissions

Project emissions represent GHG emissions that occur within the project boundary as a result of forest biomass loss and project activities.

8.2.1 Project emissions are quantified by Equitable Earth and are deducted from the project's gross emission reductions (GERs) in accordance with the requirements outlined in this section. Monitoring and reporting procedures are detailed in the *Monitoring, Reporting, and Verification (MRV)* section.

This methodology distinguishes between:

1) **Emissions from Forest Biomass Loss**: emissions from carbon stock changes attributed to deforestation and forest degradation within the project crediting area, including forest fires, grass fires, anthropogenic clearing, logging, or natural events. These emissions are centrally quantified by Equitable Earth using remote sensing methods and are included in the AUDD baseline and project carbon stock change estimates. Calculations do not require additional input from developers.

2) **Emissions from Project Activities**: emissions from project activities related to project implementation that are not captured through forest biomass changes.[10] These include, but are not limited to:

[10] It is assumed by default that emissions resulting from project operations, including fossil fuel combustion, staff and use of construction materials in infrastructure development are *de minimis* and are not required. These emissions must be accounted for and reported if they are material.

a) Biomass burning (e.g., prescribed fires)

b) Livestock grazing

c) Use of synthetic fertilisers

These emissions are assessed and quantified by Equitable Earth with inputs from developers based on the materiality assessment defined in this methodology below. For additional details on data inputs, refer to the *Quantifying Emissions from Project Activities* and *Monitoring, Reporting, and Verification (MRV)* sections.

Materiality Assessment

8.2.2 Equitable Earth must conduct a materiality assessment for each of the project activity emission sources.

8.2.3 Equitable Earth applies a materiality threshold of 1% of the total project emissions reductions and establishes the following requirements based on the materiality of emissions:

1) **Material emissions**: if any of the project activity emission sources equal or exceed the materiality threshold, such emissions are quantified by Equitable Earth with inputs from developers and must be reported by developers in the Annual Report. Refer to the *Monitoring, Reporting, and Verification (MRV)* section for additional details on data and reporting requirements.

2) **Non-material emissions**: if any of the project activity emission sources fall below the materiality threshold, such emissions are considered *de minimis* and are excluded from ongoing quantification and reporting.

8.2.4 Equitable Earth assesses the materiality of project activity emission sources using the Clean Development Mechanism (CDM) A/R methodological *Tool for testing the significance of GHG emissions in A/R CDM project activities*.[11]

8.2.5 Equitable Earth conducts the materiality assessment during the feasibility and design stages and reassesses it every five years from the project start date, aligning with the BVP and adaptive management frequency requirements.

[11] UNFCCC/CCNUCC (2007) 'Tool for testing significance of GHG emissions in A/R CDM project activities.' Version 01, EB 31, CDM – Executive Board. Available at: URL (Accessed 12/11/2025).

9 Carbon Quantification

This section provides guidance on the quantification of GHG emission reductions for projects using this methodology. Emission reductions are based on the monitored reduction of emissions from deforestation and degradation from the project AUDD baseline during the crediting period.

9.1 Quantifying AUDD Project Baseline Emissions

9.1.1 Equitable Earth quantifies AUDD project baseline emissions for the relevant carbon pools ($E^{[m]}_{B\,AUDD}$) for each monitoring period using jurisdictional biomass loss data and model-based projections of deforestation risk.[12] The main quantification steps are described below.

Historical Biomass Loss

Jurisdiction-wide historical emissions are estimated based on observed forest biomass loss during an HRP covering 10 years.

Biomass loss is derived from remote sensing data and converted to CO_2-equivalent emissions using jurisdiction-specific carbon stock values or appropriate default factors.

Emission Factor Application

For BGB, Equitable Earth calculates the BGB fraction by multiplying the above-ground tree fraction (measured using remote sensing direct biomass measurement) by an AGB/BGB ratio.[13] Where multiple default values are possible, the value most representative of the jurisdiction's ecological zone and forest condition is used.

[12] Equitable Earth uses a model to calculate project baselines based on forecasted biomass stock changes. The model is trained on historical data, and the earliest data available for training results in some limitations for projects with a start date on or before December 31, 2024. Projects with start dates on or before December 31, 2024 are eligible, but will be reviewed by Equitable Earth on a case-by-case basis. Note that certification times may be longer for projects with earlier start dates. See the Baseline Setting Module (forthcoming) for more information.

[13] The default approach is to apply AGB/BGB ratios from the 2019 IPCC Guidelines for National GHG Inventories for the region, forest type, and carbon stock category that best represents the jurisdiction. Refer to *Appendix B* for the full table and reference.

Forward Projection Using Risk Models

A risk model is trained on historical emissions and deforestation drivers to produce a jurisdiction-wide deforestation and degradation risk map.

The model predicts the spatial distribution of expected future biomass loss across the jurisdiction over a five-year projection period.

The predicted emissions represent the total future gross emissions from AUDD absent project intervention.

When the total predicted risk across the jurisdiction exceeds the JRL, the risk for each pixel is adjusted to align the total risk with the JRL.

Derivation of Project Baseline

Each project's baseline is derived by applying the spatial risk weights from the jurisdictional risk map to the project boundary.

The total of these values yields the project-specific baseline in tonnes of CO_2 per year (tCO_2e/year).

9.2 Quantifying Project Emissions

9.2.1 Equitable Earth quantifies project emissions for the current monitoring period $E_{PE}^{[m]}$ as in equation (E.5). Refer to the section *Monitoring, Reporting, and Verification (MRV)* in this methodology for project monitoring requirements.

Total project emissions for the current monitoring period can be greater than the project AUDD baseline if a major disturbance event occurs. Refer to the *Permanence* section in this methodology for additional details on reversals.

$$E_{PE}^{[m]} = E_{P\,for}^{[m]} + E_{P\,act}^{[m]} \quad \textbf{(E.5)}$$

Parameter	Description	Unit	Data Source
$E_{PE}^{[m]}$	Total project emissions for the monitoring period $[m]$	tCO_2e	(E.5)

Parameter	Description	Unit	Data Source
$E_{P\,for}^{[m]}$	Total emissions from forest biomass loss for the monitoring period $[m]$.	tCO_2e	Section *Quantifying Emissions from Changes in Project Stocks*
$E_{P\,act}^{[m]}$	Total emissions from project activities for the monitoring period $[m]$	tCO_2e	(E.6)

Quantifying Emissions from Forest Biomass Loss

9.2.2 Equitable Earth quantifies emissions from forest biomass loss by comparing carbon stock values between successive measurement periods.

If a reduction is identified, the associated emissions are calculated in accordance with equation (E.5) and applied as the project emission parameter $E_{P\,for}^{[m]}$ for that monitoring period.

Quantifying Emissions from Project Activities

9.2.3 Equitable Earth quantifies emissions from project activities when determined to be material. The total emissions for each monitoring period are calculated as the sum of all relevant emission sources, as specified in equation (E.6).

$$E_{P\,act}^{[m]} = E_{P\,act\,B}^{[m]} + E_{P\,act\,LS}^{[m]} + E_{P\,act\,SF}^{[m]} \quad \textbf{(E.6)}$$

Parameter	Description	Unit	Data Source
$E_{P\,act}^{[m]}$	Total emissions from project activities for the monitoring period $[m]$	tCO_2e	(E.6)

Parameter	Description	Unit	Data Source
$E^{[m]}_{P\ act\ B}$	Total project emissions due to the burning of biomass in project activities for the monitoring period $[m]$	tCO_2e	(E.7)
$E^{[m]}_{P\ act\ LS}$	Total project emissions due to livestock grazing in project activities for the monitoring period $[m]$	tCO_2e	(E.8)
$E^{[m]}_{P\ act\ SF}$	Total project emissions due to the use of synthetic fertilisers in project activities for the monitoring period $[m]$	tCO_2e	Section *Quantifying N_2O Emissions from the Use of Synthetic Fertilisers*

Quantifying Emissions from Biomass Burning

9.2.4 If project activities include planned burning of biomass (e.g., prescribed fires, sustainable charcoal production), emissions are quantified by Equitable Earth as the sum of all burning events based on the following method and using data inputs from developers:

1) **Quantification method**: Equitable Earth detects fires using remote sensing and quantifies emissions from biomass burning $E^{[m]}_{P\ act\ B}$ (E.7) based on stock changes between fire events.

2) **Data inputs from developers**: developers must indicate the expected burned area and the frequency of burning events, as per the fire management strategy requirement.

$$E^{[m]}_{P\ act\ B} = \left(\frac{44}{12}\right) \times 0.66 \times \sum r_{cf\ b} B_b \qquad \textbf{(E.7)}$$

Parameter	Description	Unit	Data Source
$E^{[m]}_{P\ act\ B}$	Total project emissions due to the burning of biomass in project activities for the monitoring period $[m]$	tCO_2e	(E.7)
$\left(\frac{44}{12}\right)$	Ratio of mass of carbon dioxide to the mass of carbon, used to units of convert carbon to CO_2	Dimensionless	Default factor
0.66	Proportion of (not water) biomass assumed to be lost due to burning; (1-0.33=0.66) accounts for the proportion of mass burned that is assumed to be water	Dimensionless	Simpson & Sagoe, 1991[14]
$r_{cf\ b}$	Carbon fraction of biomass for burned wood or herbaceous material b; value is from literature estimates or direct measurement	Dimensionless	Default factor
B_b	Biomass in burned wood or herbaceous material for the monitoring period $[m]$	Tonnes	Equitable Earth

Quantifying Emissions from Livestock Grazing

9.2.5 If grazing of livestock occurs during the current monitoring period, Equitable Earth quantifies emissions from grazing based on the following method and using data inputs from developers:

1) **Quantification method**: Equitable Earth quantifies emissions from livestock $E^{[m]}_{P\ act\ LS}$ (E.8) based on IPCC Good Practice Guidelines and IPCC Guidelines for National Greenhouse Gas Inventories. Refer to *Appendix C* for more details on methods.

2) **Data inputs from developers**: developers must quantify the average number of head of livestock species per category ($n_{LS\ i}$) over a 12-month period (E.8) and report the parameter yearly. Refer to *Appendix C* for more details on methods.

[14] Simpson, W. T., & Sagoe, J. A. (1991). Relative Drying Times of 650 Tropical Woods Estimation by Green Moisture Content, Specific Gravity, and Green Weight Density. USDA FS GTR-71 (pp. 1–27). Madison WI.

$$E_{P\,act\;LS}^{[m]} = \sum_{i \in r} \left(\frac{f_{LS\,i} \times n_{LS\,i}}{10^3} \right) \times 21 \qquad \textbf{(E.8)}$$

Parameter	Description	Unit	Data Source
$E_{P\,act\;LS}^{[m]}$	Total project emissions due to livestock grazing for the monitoring period $[m]$	tCO_2e	(E.8)
$f_{LS\,i}$	Emission factor for the defined livestock population i. Default values from IPCC, as shown in *Appendix C*	kg CH_4 / (head * year)	IPCC (*Appendix C*)
$n_{LS\,i}$	Average number of head of livestock species/category i for the monitoring period $[m]$	Dimensionless	Developer
21	Conversion of t CH_4 to tCO_2	Dimensionless	Default Factor

Calculating N_2O Emissions from the Use of Synthetic Fertilisers

9.2.6 If project activities include the use of synthetic nitrogen fertilisers to improve agricultural yields, N_2O emissions are quantified by Equitable Earth based on the following method and using data inputs from developers:

1) **Quantification method**: Equitable Earth quantifies emissions from the use of synthetic fertilisers $E_{P\,act\,SF}^{[m]}$ (E.6) using the CDM tool for the *Estimation of direct nitrous oxide emission from nitrogen fertilisation.*[15]

2) **Data inputs from developer**: developers must provide the mass of synthetic fertiliser types and the nitrogen content of synthetic fertiliser used over a 12-month period.

[15] UNFCCC/CCNUCC (2007) 'Estimation of direct nitrous oxide emission from nitrogen fertilization (Version 01).' CDM – Executive Board, EB 33, Report Annex 16, p. 1–6. Available at: URL (Accessed 12/11/2025).

9.3 Quantifying Emissions from Activity-Shifting Leakage

9.3.1 Equitable Earth quantifies total emissions from activity-shifting leakage for the current monitoring period $E^{[m]}_{L\,AS}$ by multiplying the avoided forest-loss emissions ($E^{[m]}_{B\,AUDD} - E^{[m]}_{P\,for}$) by a default 10% activity-shifting leakage value as in equation (E.9).

Once estimated for the current monitoring period, these cumulative emissions from leakage ($E^{[m]}_{L\,AS}$) are fixed for subsequent monitoring periods.

$$E^{[m]}_{L\,AS} = (E^{[m]}_{B\,AUDD} - E^{[m]}_{P\,for}) \times LF \quad \textbf{(E.9)}$$

Parameter	Description	Unit	Data Source
$E^{[m]}_{L\,AS}$	Total emissions from activity-shifting leakage for the monitoring period $[m]$. The parameter value cannot be less than zero.	tCO_2e	(E.9)
$E^{[m]}_{B\,AUDD}$	Project AUDD baseline during the monitoring period $[m]$	tCO_2e	Equitable Earth
$E^{[m]}_{P\,for}$	Total emissions from forest biomass loss for the monitoring period $[m]$	tCO_2e	Section *Quantifying Emissions from Changes in Project Stocks*
LF	Activity-shifting leakage default factor for monitoring period $[m]$, where LF = 0.1	tCO_2e	Equitable Earth; Section *Quantifying Emissions from Activity-shifting Leakage*

9.4 Quantifying Gross Emission Reductions (GERs)

9.4.1 Equitable Earth quantifies gross emission reductions (GERs) for a monitoring period $[m]$ as equation (E.10).

Quantified GERs should be rounded down to the nearest whole number as a conservative measure.

$$E_{GER\,ER}^{[m]} = E_{B\,AUDD}^{[m]} - E_{PE}^{[m]} - E_{L\,AS}^{[m]} - E_{D}^{[m]} \quad \textbf{(E.10)}$$

Parameter	Description	Unit	Data Source
$E_{GER\,ER}^{[m]}$	GERs for the monitoring period $[m]$	tCO_2e	(E.10)
$E_{B\,AUDD}^{[m]}$	Project AUDD baseline emissions during the monitoring period $[m]$	tCO_2e	Equitable Earth
$E_{PE}^{[m]}$	Total project emissions for the monitoring period $[m]$	tCO_2e	(E.5)
$E_{L\,AS}^{[m]}$	Total emissions from activity-shifting leakage for the monitoring period $[m]$. The parameter value cannot be less than zero	tCO_2e	(E.9)
$E_{D}^{[m]}$	Uncertainty deduction for the monitoring period $[m]$	tCO_2e	(E.3, E.4); Section *Monte Carlo Simulation*

9.5 Quantifying Net Emission Reductions (NERs)

9.5.1 Equitable Earth quantifies total net emission reductions (NERs) from AUDD activities for a monitoring period $[m]$ by subtracting the buffer pool contribution from the GERs, in accordance with equation (E.11).

$$E^{[m]}_{NER\,ER} = E^{[m]}_{GER\,ER} - E^{[m]}_{BA\,ER} \quad \textbf{(E.11)}$$

Parameter	Description	Unit	Data Source
$E^{[m]}_{NER\,ER}$	NERs for the monitoring period $[m]$	tCO_2e	(E.11)
$E^{[m]}_{GER\,ER}$	GERs for the monitoring period $[m]$	tCO_2e	(E.10)
$E^{[m]}_{BA\,ER}$	Buffer pool contribution (20% of the verified GHG reductions achieved)	tCO_2e	Programme Manual

9.5.1.1 In the context of this methodology, ECUs represent NERs from AUDD activities after all deductions.

10 Monitoring, Reporting, and Verification (MRV)

10.1 Indicators & Parameters

Parameters for Equitable Earth

Parameter	Description	Unit
$E_{B\ AUDD}^{[m]}$	Project AUDD baseline emissions for the monitoring period $[m]$, derived from the JRL and allocated to the project using the Baseline Allocation for Assessed Risk (BAAR) model	tCO_2e
$E_{PE}^{[m]}$	Total project emissions for monitoring period $[m]$, sum of emissions from forest biomass loss ($E_{P\ for}^{[m]}$) and project activities ($E_{P\ act}^{[m]}$)	tCO_2e
$E_{P\ for}^{[m]}$	Emissions from forest biomass loss for the monitoring period $[m]$	tCO_2e
$E_{P\ act}^{[m]}$	Total emissions from project activities for the monitoring period $[m]$	tCO_2e
$E_{P\ act\ B}^{[m]}$	Project emissions due to biomass burning in project activities for the monitoring period $[m]$	tCO_2e
$A_{P\ act\ B}^{[m]}$	Expected burned area due to prescribed fires for the monitoring period $[m]$	ha
$r_{cf\ b}$	Carbon fraction of biomass for burned wood or herbaceous material b	Dimensionless
$E_{P\ act\ LS}^{[m]}$	Project emissions due to livestock grazing in project activities for the monitoring period $[m]$	tCO_2e
$E_{P\ act\ SF}^{[m]}$	Project emissions due to the use of synthetic fertilisers in project activities for the monitoring period $[m]$	tCO_2e
$E_{L\ AS}^{[m]}$	Total emissions from activity-shifting leakage for the monitoring period $[m]$	tCO_2e

Parameter	Description	Unit
$E_D^{[m]}$	Uncertainty deduction for the monitoring period $[m]$	tCO_2e
$E_{GER\ ER}^{[m]}$	GERs for the monitoring period $[m]$	tCO_2e
$E_{NER\ ER}^{[m]}$	NERs for the monitoring period $[m]$	tCO_2e
$E_{BA\ ER}^{[m]}$	Buffer pool contribution	tCO_2e

Parameters for Developers

Parameter	Description	Unit
$A_{P\ act\ B}^{[m]}$	Expected burned area within the project area for the monitoring period $[m]$	ha
$F_{P\ act\ B}^{[m]}$	Number of prescribed fire events for the monitoring period $[m]$	Dimensionless
$n_{LS\ i}$	Average number of head of livestock species/category i for the monitoring period $[m]$	Dimensionless
$M_{P\ act\ SF}^{[m]}$	Mass of synthetic fertiliser used for the monitoring period $[m]$	tonnes
$NC_{P\ act\ SF}^{[m]}$	Nitrogen content of synthetic fertiliser used during the monitoring period $[m]$	g-N / 100 g fertiliser

10.2 Monitoring

Monitoring by Equitable Earth

10.2.1 Equitable Earth monitors and periodically re-evaluates the AUDD project baseline for each project in accordance with the approved BVP.

10.2.2 Equitable Earth monitors net changes in biomass carbon stock within the project crediting area for each monitoring period using remote sensing. These calculations account for emissions from deforestation and degradation.

10.2.3 Equitable Earth monitors project activity emissions that are considered material.

Monitoring by Developers

10.2.4 Developers must establish a monitoring plan and are responsible for monitoring all the metrics, parameters and indicators defined in the *Indicators & Parameters* section of this methodology and in conformance to requirements established in the Equitable Earth Standard and the Programme Manual.

10.2.5 In addition, developers must annually monitor all relevant metrics, parameters and indicators related to:

1) Conservation interventions, as set out in the *Ecological Condition* section of this methodology, and adhering to the *Theory of Change* requirements defined in the Equitable Earth Standard.

2) Livelihoods interventions, as set out in the *Theory of Change* and *Livelihoods Pillar* sections in the Equitable Earth Standard.

10.3 Reporting

Reporting by Equitable Earth

10.3.1 Using the parameters of the *Indicators & Parameters* section, Equitable Earth compiles a GHG Monitoring Report that consolidates the results of the net GHG reductions achieved during the verification period. Refer to the *Monitoring, Reporting, and Verification (MRV) Requirements* section in the Equitable Earth Standard for more details.

Reporting by Developers

10.3.2 Developers must complete the Annual Report, reporting on all relevant metrics, parameters, and indicators and consolidating the activities undertaken over the last 12 months.

10.3.3 Developers must complete the Monitoring Report, reporting on all relevant metrics, parameters, and indicators and the implementation status of activities, before each verification. Refer to the Equitable Earth Standard and the Programme Manual for more details.

Adaptive Management

10.3.4 Developers must update the Project Design Document every five years after the registration date, based on the updated assessments of the project compiled in every Annual Report. More information about adaptive management can be found in the Programme Manual.

Appendix A: Documentation History

Version	Date	Description
v0.1	21/08/2025	Version for public consultation
v1.0	13/11/2025	Public release of version 1.0 of M002 - Methodology for Terrestrial Forest Conservation

Appendix B: Default AGB/BGB Ratios

A summary table of the default AGB/BGB ratios from Table 4.4 of the 2019 IPCC Guidelines for National GHG Inventories is provided below. For domains, ecological zones, or continents not shown here, refer to the IPCC document for the complete table of values.[16]

Domain	Ecological zone	Continent	Origin (Natural/ Plantation)	Above-ground biomass (tonnes ha^{-1})	R [tonne root d.m. (tonne shoot d.m.)$^{-1}$]
Tropical	Tropical Rainforest	Africa	Natural	≤ 125	0.825
			Natural	>125	0.532
		North and South America	Natural	≤ 125	0.221
			Planted	≤ 125	0.170
			Natural	>125	0.221
			Planted	>125	0.170
		Asia	Natural	≤ 125	0.207
			Planted	≤ 125	0.325
			Natural	>125	0.212
	Tropical Moist	Africa	Natural	>125	0.232
			Natural	≤ 125	0.232
		North and South America	Natural	>125	0.2845
			Natural	≤ 125	0.284
		Asia	Natural	>125	0.323
			Natural	≤ 125	0.246
	Tropical Dry	Africa	Natural	>125	0.332
			Natural	≤ 125	0.379

[16] Domke, G., Brandon, A., Diaz-Lasco, R., Federici, S., Garcia-Apaza, E., Grassi, G., Gschwantner, T., Herold, M., Hirata, Y., Kasimir, Å., Kinyanjui, M. J., Krisnawati, H., Lehtonen, A., Malimbwi, R. E., Niinistö, S., Ogle, S. M., Paul, T., Ravindranath, N. H., Rock, J., Sanquetta, C. R., Sanz Sanchez, M. J., Vitullo, M., Wakelin, S. J., and Zhu, J. (2019) '2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories.' Volume 4: Agriculture, Forestry and Other Land Use, Chapter 4: Forest Land, Table 4.4, pp. 4.18–4.21. Available at: URL (Accessed 12/11/2025).

Domain	Ecological zone	Continent	Origin (Natural/ Plantation)	Above-ground biomass (tonnes ha^{-1})	R [tonne root d.m. (tonne shoot d.m.)$^{-1}$]
		North and South America	Natural	>125	0.334
			Natural	≤ 125	0.379
		Asia	Natural	>125	0.440
			Natural	≤ 125	0.379
	Tropical Mountain	North and South America	Natural	≤ 125	0.348
			Planted	≤ 125	0.205
			Natural	>125	0.283
		Asia	Natural	≤ 125	0.322
			Natural	>125	0.345

Appendix C: Livestock Grazing Emissions

This appendix describes methods for collecting and using data required for quantifying emissions from livestock grazing when this activity is included in the project activities and this emission source is considered material.

Emissions from livestock grazing are calculated by:

1) Determining the livestock population present; and
2) Applying the relevant default emission factors from the 2006 IPCC Guidelines for National Greenhouse Gas Inventories

Livestock Sampling

Developers must compile a complete list of all livestock species and populations present. To determine the average number of livestock heads being grazed, developers must:

1) Conduct a direct headcount of each livestock species, where possible
2) Ensure that population numbers reflect any changes over a 12-month period, including births and deaths
3) Where direct counting is not feasible, developers may use sampling methods that can be reliably extrapolated to the entire population

Once livestock numbers are established, Equitable Earth applies the relevant emission factors provided in the following tables to estimate annual CH_4 emissions.

Livestock Emission Factors

The tables below contain the default emission factors for livestock, which represent the amount of methane emitted per animal per year and vary by species, country development status, and (for cattle) region and production category.

IPCC Default Emission Factors for Livestock by Country Development Status[17] kg CH_4 /(head*yr)		
Livestock	**Developed countries**	**Developing countries**
Buffalo	55	55
Sheep	8	5
Goats	5	5
Camels	46	46
Horses	18	18
Mules and Donkeys	10	10
Deer	20	20
Alpacas	8	8
Swine	1.5	1

IPCC Default Emission Factors for Cattle by Region and Category[18] kg CH_4 /(head*yr)		
Region	**Cattle Category**	**Emission factor**
North America	Dairy	128
	Other cattle	53
Western Europe	Dairy	117
	Other cattle	57

[17] Eggleston, H. S., Buendia, L., Miwa, K., Ngara, T., and Tanabe, K. (2006) 'IPCC Guidelines for National Greenhouse Gas Inventories.' Volume 4: Agriculture, Forestry and Other Land Use, Chapter 10: Emissions from Livestock and Manure Management, Table 10.10, p. 10.28. Available at: URL (Accessed 12/11/2025).
[18] Eggleston, H. S., Buendia, L., Miwa, K., Ngara, T., and Tanabe, K. (2006) 'IPCC Guidelines for National Greenhouse Gas Inventories.' Volume 4: Agriculture, Forestry and Other Land Use, Chapter 10: Emissions from Livestock and Manure Management, Table 10.11, p. 10.29. Available at: URL (Accessed 12/11/2025).

IPCC Default Emission Factors for Cattle by Region and Category[18] kg CH_4 /(head*yr)		
Eastern Europe	Dairy	99
	Other cattle	58
Oceania	Dairy	100
	Other cattle	60
Latin America	Dairy	72
	Other cattle	56
Asia	Dairy	68
	Other cattle	47
Africa and Middle East	Dairy	46
	Other cattle	31
Indian subcontinent	Dairy	58
	Other cattle	27

Appendix D: GHG Parameters

Parameters Available at Validation

Data/ Parameter	Description	Unit	Data Source
$E_{B\ AUDD}$	AUDD project baseline for monitoring period $[m]$, derived from the JRL and allocated to the project using the BAAR model	tCO_2e / yr	Monitored and calculated by Equitable Earth
$r_{cf\ b}$	Carbon fraction of biomass for burned wood or herbaceous material b	Dimensionless	Literature estimates or direct measurement
$\left(\frac{44}{12}\right)$	Ratio of mass of carbon dioxide to the mass of carbon, used to units of convert carbon to CO_2	Dimensionless	Default Factor
$f_{LS\ i}$	Emission factor for the defined livestock population i. Default values from IPCC, as shown in *Appendix C*	kg CH_4 / (Head * Year)	IPCC (*Appendix C*)
$SE_{pixel,0}$	Standard error from the AGB provider for each pixel	tDM	AGB provider
ϱ	Correlation factor between the pixels	Dimensionless	AGB provider (E.1)
RS	Root-to-shoot ratio. The root-to-shoot ratios applied are based on the 2019 updated values	Dimensionless	IPCC 2019 Refinement to the 2006 Guidelines for National Greenhouse Gas Inventories

Data/ Parameter	Description	Unit	Data Source
	from the IPCC, which provides root-to-shoot (RS) values for each ecological zone across continents (Asia, Africa, North and South America), distinguishing between above-ground biomass values less than and greater than 125 $tDM \cdot Ha^{-1}$. Equitable Earth uses values specific to natural origins[19]		
GWP_g	Global Warming Potential per gas *g*	Dimensionless	IPCC's Sixth Assessment Report (AR 6)

[19] Calvo Buendia, E., Tanabe, K., Kranjc, A., Baasansuren, J., Fukuda, M., Ngarize, S., Osako, A., Pyrozhenko, Y., Shermanau, P. and Federici, S. (2019). 'IPCC 2019, 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories'. Published: IPCC, Switzerland. Volume 4, Chapter 4, Table 4.4, p 4.18. Available at: URL (Accessed 12/1/2025).


Equitable
Earth