ECORA Carbon Credit Certification Program

Document: MEEC001 – REDD/P Methodology

Public Consultation Stage

May 2026

Table of Contents

List of Tables

1. List of Documents

The application of this methodology must comply with the mandatory requirements of the documents of the ECORA Carbon Credit Certification Program listed below:

Code	Name
	ECORA Standard
DIEC001	Guidelines of the Regulatory Framework Applicable to Projects
MOEC001	Measurement of Carbon in Vegetation Module
MOEC002	Uncertanties Qantification Module
MOEC003	Quantification of Greenhouse Gas Emissions and Reductions of Carbon Stocks Module
FEEC001	Non-Permanence Risk Tool for AFOLU Projects
FEEC002	Tool for Demonstration of Additionality
FEEC003	Socio-environmental Safeguards and SDG Tool

2. Acronyms and Definitions

Term	Definition
Agriculture, Forestry and Other Land Uses (AFOLU)	The sector defined by the IPCC that brings together Agriculture, Forestry, and Other Land Use activities used in the accounting of emission reductions or GHG removals.
Baseline Scenario (BS)	Reference scenario quantified against which the mitigation effects of GHG provided by the project are measured, representing the emissions and/or removals that would occur in the absence of the implementation of the Project Activity, serving as a parameter to calculate the climate benefits generated.
Biome	Definition applied to Brazil by IBGE that delimits a set of life (plant and animal) constituted by the grouping of contiguous and regionally identifiable types of vegetation, with similar geoclimatic conditions and a shared history of changes, resulting in its own biological diversity. The following continental Biomes of Brazilian territory are considered: Amazon Biome, Atlantic Forest Biome, Caatinga Biome, Cerrado Biome, Pantanal Biome, and Pampa Biome.
Brazilian Institute of Environment and Renewable Natural Resources (IBAMA)	Federal agency linked to the Ministry of Environment and Climate Change, responsible for inspecting, licensing, monitoring, and protecting the environment in Brazilian territory.
Certificate of Rural Property Registration (CCIR)	Document issued by the National Institute for Colonization and Agrarian Reform (INCRA) that proves a rural property is registered in the National Rural Registry System (SNCR) and has its data updated, being mandatory for transactions such as sale, mortgage, subdivision, or bank financing.
Conserved Native Ecosystem	An area that represents a non-degraded version of the native ecosystem with its flora, fauna, and other biotic and abiotic elements developing in balance and without human intervention.
Deforestation	Anthropic intervention that results in the removal of native vegetation (native Forest and Savanna) from an area with conversion to another land use.
Degradation	Losses of carbon stock from native vegetation without conversion to another land use.
Disturbance	Losses of carbon stock caused by natural events such as fires, storms, hurricanes, extreme drought events, or floods, etc.
Eligibility	Set of criteria and requirements that a project must meet to be qualified and accepted within a certification program or methodology.
Forest Stewardship Council (FSC)	International organization that establishes principles and criteria for responsible forest management, as well as for the certification of the chain of custody of forest-based products.
Greenhouse Gases (GHG)	Gaseous components of the atmosphere, natural or anthropogenic, that absorb and emit radiation at specific wavelengths within the spectrum of infrared radiation emitted by the Earth's surface, the atmosphere, and clouds.
Immediate Geographic Region	These are demographic regions, defined by IBGE, that have the urban network as their main reference element. These regions are structured based on nearby urban centers to meet the immediate needs of the populations.

Term	Definition
Intergovernmental Panel on Climate Change (IPCC)	UN panel created in 1988 that assesses the science, impacts, and solutions for climate change.
Leakage	Net change in GHG emissions that occurs outside the boundaries of a project as an indirect result of its implementation.
Legal Reserve Area (RL)	According to Law No. 12.651/2012, it is the area located within a rural property or holding, with the function of ensuring the sustainable economic use of the natural resources of the rural property, assisting in the conservation and rehabilitation of ecological processes, and promoting the conservation of biodiversity, as well as the shelter and protection of wildlife and native flora.
Materiality	Materiality is the concept according to which errors, omissions, or distortions, whether isolated or combined, that may influence decisions regarding registration, verification, issuance of carbon credits, replacement of carbon credits due to reversals, or project compliance must be identified, assessed, and addressed. A value of ± 5% will be considered as material discrepancy, which should be used as a reference for decision-making involving the description of materiality throughout this standard.
Monitoring, Verification and Reporting (MVR)	Set of processes to measure, report and confirm the reduction or removal of GHG.
Native Ecosystem	An area composed of a set of biotic and abiotic components that have evolved locally, interacting to form complex food webs, nutrient cycles, and energy flows.
Native Forest	Native ecosystem mainly characterized by the density of trees in the upper stratum of vegetation formations, where some trees can reach heights up to or greater than 50m. The densification and canopy cover promote the reduction of the amount of light reaching the ground, limiting the establishment and development of herbaceous and shrub plants in the lower stratum of forests. Primary: that of maximum local expression, with great biological diversity, where the effects of anthropic actions are minimal or absent, to the point of not significantly affecting its original structural characteristics and occurring botanical species. Secondary: that resulting from natural succession processes, after total or partial suppression of primary vegetation by anthropic actions or natural causes, with possible occurrence of remnant trees from the primary vegetation.
Native Savanna	Native ecosystem characterized by shared dominance between trees and herbaceous plants, with the arboreal component being of medium or low height, generally spaced apart and with broad canopies and low branching. The herbaceous component is practically continuous, forming a carpet between the trees and shrubs
Native Vegetation	Refers to the set of plants that occur naturally in a given region adapted to the climatic conditions, soil, and local fauna, helping to maintain biodiversity and preserve native ecosystems.
Peat	Organic material formed by the partial accumulation of plant matter in water-saturated environments, under anaerobic conditions, where the rate of decomposition is lower than the rate of biomass deposition. These deposits occur predominantly in wet areas, such as peatlands, and have a

Term	Definition
	high concentration of organic carbon accumulated over thousands of years.
Permanent Preservation Area (APP)	Permanent Preservation Area, according to Law No. 12.651/2012, is a protected area, covered or not by native vegetation, with the environmental function of preserving water resources, landscape, geological stability, and biodiversity, facilitating the gene flow of fauna and flora, protecting the soil, and ensuring the well-being of human populations.
Project Activity	Action or set of specific actions within the Project Area that generates emission reductions and/or GHG removals.
Project Area	Project Area is defined by the specific geographic boundaries where the Project Activity occurs and where ECORA Carbon Units (UCEs) are issued.
Project Designer	Individual or legal entity formally designated by the Project Proponent to develop, monitor, and be technically responsible for a project for emission reductions or GHG removals. The Project Designer may be the Project Proponent themselves or a different entity, provided there is a formal delegation of responsibilities. The Project Designer does not hold legal rights over the project or the credits generated, except when they are also the Project Proponent by express legal ownership.
Project Proponent	Individual or legal entity that holds formal authority and responsibility for the design, implementation, and management of the emission reduction or GHG removal project. The Project Proponent is the legal holder of the UCEs at the time of their issuance. May or may not be the Project Designer, as established in the contractual instruments between the parties.
Reducing Emissions from Deforestation and Degradation of Native Vegetation (REDD)	Category of activities in the AFOLU sector that encompasses native vegetation protection practices aimed at reducing GHG emissions.
Reducing Emissions from Planned Deforestation and Degradation of Native Vegetation (REDD/P)	REDD activity category that aims to prevent deforestation and degradation of native vegetation that would be carried out in a planned and regular manner in the Baseline Scenario.
Remotely Piloted Aircraft (RPA)	They are unmanned aircraft piloted from a remote station, used for commercial, corporate, or experimental purposes, commonly known as drones.
Rural Environmental Registry (CAR)	Mandatory electronic public registry, established by Law No. 12.651/2012, intended for rural properties in Brazil. The CAR records the georeferenced information of the rural property, including perimeter boundaries, permanent preservation areas (APP), legal reserve (RL), native vegetation, consolidated and restricted use areas, which supports monitoring, control, and environmental regularization.
tCO_{2e}	Carbon dioxide equivalent (CO_2e) is the unit of measurement (measured in tons) that compares the radiative forcing of a greenhouse gas to that of carbon dioxide, being calculated by the mass of the gas multiplied by its global warming potential (GWP).
Technical Responsibility Annotation (ART)	From Portuguese, *Anotação de Responsabilidade Técnica*, is a legal, administrative, and technical instrument that formalizes the link between a qualified professional and a technical activity performed by them, establishing responsibility, authorship, scope of practice, and commitment to technical and legal standards.
Uncertainty	Lack of knowledge of the true value of a variable that can be described by a Probability Density Function (PDF),

Term	Definition
	characterizing the range and probability of possible values. Uncertainty depends on the analyst's state of knowledge, which in turn depends on the quality and quantity of applicable data, as well as knowledge of underlying processes and inference methods.
Wetlands	Ecosystems at the interface between terrestrial and aquatic environments, continental or coastal, natural or artificial, permanently or periodically flooded or with waterlogged soils. The waters can be fresh, brackish, or salty, with plant and animal communities adapted to their hydric dynamics.

3. Introduction

3.1 Presentation

The Agriculture, Forestry and Other Land Use (AFOLU) sector represents one of the main sources of Greenhouse Gas (GHG) emissions, especially in tropical countries, where deforestation and land use changes are predominant factors. The Cancun Agreements (UNFCCC, 2011) recognized that conservation actions, sustainable forest management, increased carbon stocks, and reduced deforestation are essential elements to mitigate emissions and promote adaptation to climate change.

Considering the importance of conserving different types of ecosystems to address climate change, this methodology covers REDD/P projects (Reduction of Emissions from Planned Native Vegetation Deforestation) in native forests and savannas, promoting the recognition and inclusion of the ecological diversity present in Brazil and other tropical regions.

The REDD/P Methodology establishes criteria, requirements, and procedures to design, monitor, report, verify, and certify Project Activities aimed at avoiding the deforestation of native vegetation that would be carried out in a planned and regular manner in the Baseline Scenario.

3.2 Principles

The ECORA Methodology REDD/P is guided by the normative principles of ISO 14064-2 and ISO 14080, as detailed below:

- **Relevance:** Selection of GHG sources, GHG reservoirs, and data that are material and appropriate for those applying the methodology;
- **Consistency:** Possibility of meaningful comparisons between information related to GHG;
- **Comparability:** Diligence so that the results obtained through this methodology can be compared consistently and transparently between different projects;
- **Compatibility:** Harmonization of climate action methodologies to improve aggregation and the effectiveness of their application;
- **Integrity (or Completeness):** Inclusion of all relevant GHG emissions and/or removals, and all information necessary to support the adopted criteria and procedures;
- **Conservativeness:** Use of conservative assumptions, values, and procedures to avoid overestimating GHG emission reductions or removals;
- **Practicality:** Structuring procedures in a simple and applicable way, taking into account available resources and offering clear indicators to support decision-making;
- **Flexibility:** Allowing adjustments in the methodology according to data availability and the technical and institutional capacities of each context;
- **Credibility:** Strengthening confidence in the process through integrity, responsibility, and transparency at all stages;
- **Accuracy:** Reduction of biases and uncertainties as far as technically feasible;
- **Transparency:** Disclosure of sufficient and adequate information concerning GHG so that users can make decisions with a reasonable level of confidence.

3.3 Strategic Contribution

Projects implemented under this methodology contribute to climate change mitigation by avoiding emissions associated with legally permitted deforestation of native vegetation, while simultaneously promoting the maintenance of ecosystem services, biodiversity preservation, and the generation of socioeconomic co-benefits. Thus, they support the achievement of national and international climate goals and reinforce the strategic role of nations within the scope of the Paris Agreement.

3.4 Objective and Scope

The objective of this methodology is to establish the requirements for the design, implementation, monitoring, reporting, and verification of REDD/P projects.

Scope of application:

- **Territorial scope:** applicable to areas with native vegetation that can be legally deforested;
- **Exclusions:** does not apply to mitigation activities that avoid unplanned deforestation and to areas where the deforestation of native vegetation is prohibited, where there is no legal right to deforest, or where the plausible risk of future legal deforestation cannot be credibly and conservatively demonstrated according to the eligibility requirements of this methodology;
- **Greenhouse Gases (GHG):** accounts for emissions of CO_2, CH_4 and N_2O associated with the deforestation of native vegetation and activities associated with deforestation;
- **Carbon reservoirs:** considers above- and below-ground biomass (woody and non-woody), dead wood, litter, and soil organic carbon. The exclusion of reservoirs treated as optional is only permitted with technical justification.

4. Eligibility

This methodology adopts the eligibility requirements defined in the ECORA Standard and additionally establishes the mandatory requirements described below.

Compliance with the eligibility criteria must be demonstrated by the Project Designer through objective, traceable, and verifiable evidence.

This methodology allows the project to be classified as a Fixed Project or a Scalable Project. When the project is classified as a Scalable Project, upon the addition of a new Project Component (PC), all requirements presented must be met.

The eligibility assessment must be carried out in two stages:

a. Stage 1 — General mandatory requirements. Failure to meet any requirement makes the project ineligible for the methodology;

b. Stage 2 — Mandatory requirements with performance evaluation. A zero score in any of the requirements and/or a total score below 60 make the project ineligible for the methodology.

4.1 Stage 1 — General Requirements

The project must meet all Stage 1 requirements to advance to Stage 2. Failure to meet any requirements makes the project ineligible for the methodology.

General Requirement 1 – Eligible Native Ecosystem

The Project Area must be composed exclusively of terrestrial native vegetation (forest or savanna), classified as primary and/or secondary for at least 10 years prior to the Project Start Date. Wetlands and peatlands are excluded.

General Requirement 2 – Legality of Planned Deforestation

At least one of the approaches below must be proven.

Approach A — Deforestation already authorized by the competent authority: Environmental license and/or specific authorization for deforestation of native vegetation issued by the competent authority and valid on the start date of the Crediting Period.

Approach B — Deforestation not yet authorized by the competent authority: Compliance report of the property demonstrating surplus Legal Reserve (RL) area with native vegetation (specific for projects developed in Brazil).

All the sub-items below are mandatory and cumulative when Approach B is adopted:

a. Geospatial and documentary analysis demonstrating the absence of overlap of the Project Area with: Conservation Units; Indigenous Lands; Quilombola Territories; Agrarian Reform Settlements; Embargoed Areas;

b. Updated property registration, with RL recorded, without restrictions/burdens on the Project Area (e.g., environmental easement, embargoes, restrictive annotations);

c. Valid Rural Property Registration Certificate (CCIR), with code from the National Rural Registration System (SNCR);

d. Approved Georeferencing Certification of the Rural Property from the Land Management System (SIGEF Certification);

e. Regular Rural Land Tax (ITR), with no outstanding issues with the Federal Revenue Service.

f. Active Rural Environmental Registry (CAR), demonstrating surplus RL area, with no restrictions/burdens on the Project Area (e.g., environmental easement, embargoes, overlaps);

g. Geometric consistency between Registration, SIGEF Certification, and CAR, including the same area, perimeter, and delimitation of RL, Permanent Preservation Area (APP), and other areas.

General Requirement 3 – Technical and Environmental Conditions of Planned Deforestation

At least one of the approaches below must be proven.

Approach A — Deforestation already authorized by the competent authority: Technical documentation that supported the issuance of the environmental license and/or specific authorization for deforestation of native vegetation issued by the competent authority and valid on the start date of the Crediting Period

Approach B — Deforestation not yet authorized by the competent authority: Technical-environmental assessment report for deforestation, accompanied by Technical Responsibility Annotation (ART) or equivalent document in the host country of the qualified professional containing, at a minimum (mandatory and cumulative):

a. Definition of biome and phytophysiognomy;
b. Definition of vegetation typology;
c. Total area of the property (ha);
d. RL area (ha and % of the property);
e. Area eligible for legalized deforestation (ha and % of the property);
f. Map delimiting the georeferenced polygons (min. four pairs of coordinates) of the property perimeter, remaining native vegetation area, RL area, area eligible for legalized deforestation; APP and other relevant areas in defining the area eligible for legalized deforestation;
g. Estimate of woody volume based on validated secondary data following the hierarchy of Section 9.1;
h. Estimate of annual deforestation area;
i. Georeferenced map of the area eligible for legalized deforestation with delimitation of the area to be cleared each year, according to the execution schedule.

When the existing license or authorization does not cover the entire area planned under the Baseline Scenario, the Project Designer must submit a substantiated technical statement, accompanied by ART or equivalent document, demonstrating the legal, technical, and operational feasibility of the remaining stage, which must go through stage 2.

4.2 Stage 2 — Performance Requirements

The Project Designer must carry out the performance assessment for all eight performance requirements and sum the assigned scores. A zero score in any of the requirements and/or a total score below 60 make the project ineligible for the methodology.

Performance Requirement 1 – Documentary Assessment

Assessment of the available documentation of the property where the Project Area is located for the purpose of deforestation legality.

Points	Situation / Evidence
0	Property without the regularity documentation listed in General Requirement 2 of Approach B. <u>Project ineligible for the methodology.</u>
3	Property regularity report with surplus RL (General Requirement 2, Approach B).

Points	Situation / Evidence
8	Property regularity report with surplus RL (General Requirement 2, Approach B) with protocol of administrative process request for deforestation licensing/authorization to the competent authority, dated no more than 12 months ago.
10	Environmental license and/or specific deforestation authorization issued by the competent authority valid on the start date of the Crediting Period.

Performance Requirement 2 – Licensing History

Assessment of the history of issuance of licenses/authorizations for deforestation of native vegetation issued by the competent authority of the jurisdiction where the project is located.

Points	Situation / Evidence
0	No issuance of deforestation license/authorization in the jurisdiction in the 36 months prior to the Project Start Date. <u>Project ineligible for the methodology.</u>
3	1–25 issuances of deforestation license/authorization in the jurisdiction in the 36 months prior to the Project Start Date.
8	26–75 issuances of deforestation license/authorization in the jurisdiction in the 36 months prior to the Project Start Date.
10	License and/or specific deforestation authorization valid on the start date of the Crediting Period specifically for the Project Area or more than 75 issuances of deforestation license/authorization in the jurisdiction in the 36 months prior to the Project Start Date.
Note 1: *Valid licenses/authorizations are those with the same type of enterprise (public or private) as the Project Area and the same purpose as the Baseline Scenario (e.g.: agriculture, livestock);* ***Note 2:*** *Official databases such as IBAMA (Sinaflor) and/or state databases must be used;* ***Note 3:*** *If the public access databases of the jurisdiction where the Project Area is located are proven to be outdated, alternative evidence may be used to show that licenses/authorizations were issued in the 36 months prior to the Project Start Date (e.g.: interview with representatives of competent authorities). In this case, score 3 must be assigned, regardless of the number of license/authorization issuances.*	

Performance Requirement 3 – Technical-Environmental Conditions

Assessment of the available documentation for the Project Area for the purpose of technical-environmental feasibility of deforestation.

Points	Situation / Evidence
0	No technical characterization of the vegetation or the area eligible for clearing. <u>Project ineligible for the methodology.</u>
3	Technical-environmental report with Technical Responsibility Annotation (ART) containing all sub-items of General Requirement 3, Approach B.
8	Technical-environmental report with Technical Responsibility Annotation (ART) containing all sub-items of General Requirement 3, Approach B, plus a forest inventory and detailed deforestation schedule.
10	Technical documentation submitted to the competent authority along with the protocol for the request of license/authorization for deforestation already issued.

Performance Requirement 4 – Logistical Access

Assessment of the logistical accessibility conditions of the Project Area for the feasibility of implementing post-deforestation use in the Baseline Scenario.

<table>
<tr><th>Points</th><th>Situation / Evidence</th></tr>
<tr><td>0</td><td>No evidence of viable logistical access for conversion or outflow of production. Project ineligible for the methodology.</td></tr>
<tr><td>3</td><td>Logistical access identified with geospatial demonstration based on empirical data, but not corresponding to any of the situations described below.</td></tr>
<tr><td>8</td><td>Geospatial demonstration indicating correspondence with only one of the situations described below.</td></tr>
<tr><td>10</td><td>Geospatial demonstration indicating correspondence with more than one situation described below.</td></tr>
<tr><td colspan="2">Situation 1: The perimeter of the Project Area located within a maximum distance of 40 km from main highways (paved or unpaved) and up to 5 km from secondary roads;

Situation 2: The perimeter of the Project Area located within a maximum distance of 50 km from operational railways used for the transport of agricultural or mineral commodities and no more than 5 km from secondary roads or main highways (paved or unpaved);

Situation 3: The perimeter of the Project Area must be located within a maximum distance of 1 km from navigable rivers used for river transport.

Note 1: The assessment of logistical accessibility must use official databases supplemented by on-site evidence that proves operationality compatible with the activity of the Baseline Scenario.

Note 2: Secondary roads (also known as vicinal roads) were considered to be all local or rural access roads not classified as main highways, including paved and unpaved roads that provide traffic conditions for cargo vehicles, including heavy traffic.

Note 3: In the context of the Transport Infrastructure Base, roads classified as implemented, paved, as well as unpaved roads, that present operational conditions compatible with truck traffic, were considered eligible.
Note 4: The reference distances applied to assess the influence of infrastructure access on deforestation risk were established based on available scientific and technical literature, especially Barber et al. (2014) and RAISG (2021), which demonstrate the relationship between proximity to roads, territorial accessibility, advancement of occupation fronts, and increased deforestation pressure.</td></tr>
</table>

Performance Requirement 5 – Regional Productive Infrastructure

Assessment of the existence of productive infrastructure compatible with the alternative land use of the Baseline Scenario.

Points	Situation / Evidence
0	No evidence of productive infrastructure compatible with the alternative use foreseen in the Baseline Scenario. Project ineligible for the methodology.
3	At least one item of infrastructure compatible with the alternative use foreseen in the Baseline Scenario at a distance justified by empirical data, with verifiable identification, geospatial location, and proof of active operation.
8	At least one item of infrastructure compatible with the alternative use planned in the Baseline Scenario within 100 km of the perimeter of the Project Area, with verifiable identification, geospatial location, and proof of active operation.

Points	Situation / Evidence
10	More than one item of infrastructure compatible with the alternative use foreseen in the Baseline Scenario within 100 km of the perimeter of the Project Area, with verifiable identification, geospatial location, and proof of active operation.
For the purposes of this methodology, the following elements are considered productive items of infrastructure: a. Slaughterhouses or meatpacking plants; b. Dairies; c. Grain silos or warehouses; d. Agricultural cooperatives; e. Agro-industrial hubs; f. Agricultural marketing or processing centers.	

Performance Requirement 6 – Territorial Pressure

Assessment of whether the Project Area is located in a region where a dynamic of deforestation for land use conversion is widespread.

Points	Situation / Evidence
0	No geospatial evidence of deforestation with land use conversion of an area equal to or greater than 50% of the Project Area within a maximum distance of 10 km from the perimeter of the Project Area in the six years prior to the Project Start Date. Project ineligible for the methodology.
3	Geospatial evidence of deforestation with land use conversion of an area equal to or greater than 50% of the Project Area within a maximum distance of 10 km from the perimeter of the Project Area in the six years prior to the Project Start Date.
8	Geospatial evidence of deforestation with land use conversion within a maximum distance of 10 km from the perimeter of the Project Area in the six years prior to the Project Start Date, with the sum of the deforested areas being equal to or greater than the total area of the Project Area and at least one of the continuous areas having an extension equal to or greater than 50% of the total area of the Project Area.
10	Geospatial evidence of deforestation with land use conversion within a maximum distance of 5 km from the perimeter of the Project Area in the three years prior to the Project Start Date, with the sum of the deforested areas being equal to or greater than the total area of the Project Area and at least one of the continuous areas having an extension equal to or greater than 50% of the total area of the Project Area.
The geospatial analysis must be carried out based on recognized data (e.g., MapBiomas, PRODES). The Project Designer must present documentary and geospatial evidence that proves territorial pressure, including at least: a. Geographical location and size of the deforested areas and those converted for alternative land use; b. Period of occurrence of deforestation.	

Performance Requirement 7 – Financial Capacity

Assessment of the existence of financial conditions for carrying out the deforestation of native vegetation and implementing the alternative land use planned in the Baseline Scenario.

Points	Situation / Evidence
0	No dated and verifiable documentary evidence of access to financial resources for the implementation of deforestation and alternative land use foreseen in the Baseline Scenario. <u>Project ineligible for the methodology.</u>
3	Dated and verifiable documentary evidence of partial access (at least 50%) to financial resources for the implementation of deforestation and alternative land use planned in the Baseline Scenario, when complemented by dated and verifiable documentary evidence of probable access to resources that cover the total amount needed (e.g.: financing proposal, credit line under review, contract under negotiation).
8	Dated and verifiable documentary evidence of full access to financial resources for the implementation of deforestation and alternative land use planned in the Baseline Scenario (e.g.: bank statement, approved financing contract, released credit line).
10	Dated and verifiable documentary evidence of full access to financial resources for the implementation of deforestation and alternative land use planned in the Baseline Scenario (e.g.: bank statement, approved financing contract, released credit line), with evidence of a history of implementation of the same land use by the same Deforestation Agent of the project.

Performance Requirement 8 – Operational Capacity

Assessment of the existence of operational capacity to carry out the deforestation of native vegetation and implement the alternative land use planned in the Baseline Scenario.

Points	Situation / Evidence
0	No dated and verifiable documentary evidence of operational capacity to carry out deforestation or implement the alternative use planned in the Baseline Scenario.
3	Dated and verifiable documentary evidence of partial access to equipment, services, or infrastructure, with mapping of possible suppliers/access means to cover the entire schedule of activities planned in the Baseline Scenario.
8	Dated and verifiable documentary evidence demonstrating operational capacity compatible with the scale, schedule, and activities planned in the Baseline Scenario.
10	Dated and verifiable documentary evidence demonstrating capacity compatible with the scale, schedule, and activities planned in the Baseline Scenario, with evidence of a history of implementation of the same land use by the same Deforestation Agent of the project.
The documentary evidence of access to necessary equipment, infrastructure, or services may include, but is not limited to: a. Proof of Ownership or rental contract for agricultural or forestry machinery; b. Employment contract with employees; c. Contracts for the provision of deforestation, soil preparation, or productive implementation services.	

5. Project Scope

5.1 Project Geographic Boundary

Project Area

The Project Designer must delineate and record in the PDD the geographic boundaries of the Project Area and, when applicable, the internal stratifications used for the implementation of activities and/or for monitoring and accounting purposes, in order to allow traceability of the spatial information used in validation and verification.

The Project Area may encompass one or more contiguous or non-contiguous polygons, with more than one non-contiguous area, provided that each polygon has a unique identification and meets the eligibility requirements of Section 4.

In the project registration process, the Project Designer must provide a vector file of the polygon(s) (.shp, .gpkg, .geojson, or .kml), accompanied by metadata.

For each polygon, the PDD must include the unique identification (ID), polygon name, and geospatial boundary properly georeferenced with an official spatial reference system (in Brazil: SIRGAS 2000).

The delimitation of the areas must be obtained by one of the following methods: |

a. Field survey using GNSS receivers, with correction by real-time kinematic positioning (RTK, Real-Time Kinematic) and/or by post-processed kinematic (PPK, Post Processed Kinematic);
b. Orthorectified images obtained by unmanned aerial vehicles or airplanes;
c. Remote sensing images obtained by satellites with a minimum spatial resolution of 30 m and a recommended resolution of 10 m.

The geographic boundaries of the Project Area must be established in accordance with the eligibility requirements of Section 4, and non-eligible areas must be excluded, such as, but not limited to, areas with land use without native vegetation, access roads, infrastructure, hydrography, Permanent Preservation Areas (APP), and Legal Reserve (RL) areas. The Project Area must be represented and presented, at a minimum, by means of the following thematic maps: location, vegetation, relief, slope, and soil classes.

For projects carried out in Brazil, the scope of vegetation classification includes the two major groups: native Forest and Savanna, according to the land use and cover classification of MapBiomas, defined as Forest Formation and Savanna Formation. Both classifications are established based on the Technical Manual of Brazilian Vegetation of the Institute of Geography and Statistics (IBGE), also a reference for the delimitation of vegetation formations present in the National Communication and in the types of vegetation that underpin the FREL (Forest Reference Emission Level).

For projects carried out outside Brazilian territory, the vegetation classification must follow, when available, a REDD+ reference level submitted to the *United Nations Framework Convention on Climate Change* (UNFCCC), the definitions proposed by the FAO, or official definitions of the project's host country.

Potential Leakage Area

The Potential Leakage Area (PLA) corresponds to the portion of the territory located outside the boundaries of the Project Area where there is a possibility of additional GHG emissions resulting from the implementation of the Project Activity. The geographic delimitation of the PLA, to be used in the assessment and quantification of leakage due to activity displacement, must follow the criteria and procedures presented in Section 9.4.

5.2 Project Temporal Boundary

Project Start Date

For the purposes of this Methodology, the Project Start Date is the date of the first formal and legally binding evidence by which the holder(s) of the Project Area cease(s) to exercise the legal right to clear native vegetation and assume(s) the commitment to conserve it, marking the beginning of activities that result in GHG emission reductions.

The following are considered formal and legally binding evidence of the Project Start Date, including but not limited to:

a. Formal instruments that prove the start of project implementation with binding effects on land use, such as: a contract signed between the titleholder and/or land use rights holder and other involved parties (Project Proponents and/or Project Designer); agreements signed with local communities regarding area protection; and documented commencement of protection activities agreed upon by all relevant parties;

b. Commitment term, conservation agreement, use restriction, environmental easement, or equivalent instrument, registered with a notary or competent authority, establishing the obligation to conserve native vegetation in the Project Area. Only voluntary instruments will be accepted, not linked to the regularization of past deforestation, environmental liabilities, infractions, embargoes, or any legal requirements. The Project Designer must provide traceable evidence that the instrument does not arise from a sanctioning or compensatory obligation.

Crediting Period

The Crediting Period must meet the minimum term established in the latest version of the ECORA Standard in force.

For the purposes of this methodology, the Crediting Period Start Date must correspond to the first date on which planned deforestation would occur in the absence of the project, as demonstrated by the deforestation plan and the respective schedule applicable to the Project Area.

The Project Designer must demonstrate that the adopted Crediting Period Start Date is consistent with the deforestation plan, the conversion schedule, and other elements used in the demonstration of the Baseline Scenario, in order to maintain temporal consistency between the identified deforestation risk and the effective start of emission reductions accounting.

In scalable projects, areas added after the Project Start Date must have the inclusion date recorded in the DDP, with equivalent evidence of the start of activity implementation for the included polygon(s).

Commitment Period

The Commitment Period of the project must meet the requirements defined in the ECORA Standard.

Throughout the entire Commitment Period, including after the end of the Crediting Period, the Project Designer must:

a. Maintain actions, structures, and procedures to reduce the risk of deforestation in the Project Area;

b. Record and provide evidence of the execution of these actions;

c. Monitor the maintenance and/or loss of native vegetation in the Project Area and Potential Leakage Area.

5.3 Reservoir and Sources of Emissions

In accordance with the IPCC (2006) Guidelines for AFOLU, the quantification of avoided emissions requires consideration of the main carbon reservoirs for the type of native vegetation considered for the project.

This methodology requires:

a. That the stock levels in the Baseline Scenario are determined for the entire Crediting Period;

b. That the variation in carbon stocks in all defined reservoirs be calculated for each period "t" defined in this methodology. The exclusion of any reservoir, when permitted, must be justified in the PDD;

c. That the carbon stock stored in wood products (if included) is calculated according to its durability for each period "t" defined in this methodology.

The Project Designer must estimate the variations in carbon stocks considering the reservoirs defined in Table 1 and the emission sources defined in Table 2, respecting the requirements and justifications defined in this methodology.

Changes in stocks must be accounted for in the Baseline, project, and leakage Scenarios, promoting methodological consistency.

Table 1. Carbon reservoirs for accounting for changes in carbon stocks

Carbon Reservoir	Acronym	Requirement	Justifications
Aboveground woody biomass	B_{Ac}	Mandatory	Relevant reservoir in deforestation, with rapid release of CO_2 through combustion and decomposition.
Belowground woody biomass	B_{Ab}	Mandatory	Reservoir directly related to B_{Ac}.
Aboveground non-woody biomass	$B_{NL,Ac}$	Mandatory	Relevant reservoir in post-deforestation land use. For the initial condition, a value of zero may be assigned according to the requirements of Section 9.2.
Belowground non-woody biomass	$B_{NL,Ab}$	Mandatory	Reservoir directly related to $B_{NL,Ac}$.
Dead wood	MM	Optional	Conservative to exclude.
Litter	SE	Optional	Conservative to exclude.
Soil organic carbon	COS	Optional	Conservative to exclude.
Wood products	PM	Mandatory	Reservoir associated with carbon allocated in products, altering the temporal release profile and avoiding overestimation in the Baseline Scenario.

Table 2. Greenhouse Gases considered in vegetation deforestation

Scenarios	Emission source	Gases	Inclusion rules	Justification
Baseline Scenario	Biomass burning	CO_2	Included	Main emission source. Reductions in carbon stock due to burning are accounted for as a variation in carbon stock.

Scenarios	Emission source	Gases	Inclusion rules	Justification
		CH_4	Evaluate	Non-CO_2 gases emitted by biomass burning. It is conservative not to include.
		N_2O	Evaluate	
	Fossil fuel combustion	CO_2	Evaluate	Normally treated as insignificant (materiality < 5%). It is conservative not to include.
		CH_4	Evaluate	
		N_2O	Evaluate	
	Fertilizer use	N_2O	Evaluate	Include when the application of nitrogen fertilizers is an expected practice in the new land use after deforestation (such as agriculture or pasture).
	Liming	CO_2	Evaluate	Include when liming is an expected practice in the new land use after deforestation (such as agriculture or pasture).
Project Scenario	Biomass burning	CO_2	Included	Main emission source. Reductions in carbon stock due to burning are accounted for as a variation in carbon stock.
		CH_4	Included	Non-CO_2 gases emitted by biomass burning. Its inclusion in the Project Scenario is a conservative approach, as it avoids underestimating emissions.
		N_2O	Included	
	Fossil fuel combustion	CO_2	Evaluate	Include when the use of fossil fuels is associated with activities implemented in the Project Area.
		CH_4	Evaluate	
		N_2O	Evaluate	
	Fertilizer use	N_2O	Evaluate	Include when project activities involve the application of nitrogen fertilizers.
	Liming	CO_2	Evaluate	Include when project activities involve the application of lime to the soil.

Reservoirs and emission sources may be excluded when it is demonstrated that their contribution is immaterial (materiality <5%), according to the significance estimate calculated in accordance with the procedures established in Appendix A.

When new material sources of emission or removal are identified during the Project Crediting Period, the Project Designer must incorporate them into the Project Scenario and reassess the Baseline Scenario in order to maintain methodological integrity and comparability between scenarios. The reassessment of the Baseline Scenario, if applicable, must occur in the verification following the identification of changes in emission sources.

6. Baseline Scenario

6.1 Definition of the Baseline Scenario

The Baseline Scenario represents the most plausible trajectory of evolution of land use in the Project Area in the absence of the Project Activity.

The Baseline Scenario must be defined specifically for each project and for each Project Component, plausibly and defensibly representing the alternative land use in the absence of the project.

The identification and characterization of alternative land use scenarios must follow the criteria established in Step 1 of FEEC002: Tool for Demonstration of Additionality. After applying the tool, the Baseline Scenario (without the Project Activity) must be established: continuation of current practices and legally authorized conversion of native vegetation to another land use, supported by relevant documentation established in Section 4.

The Project Designer must present a georeferenced map indicating the area planned for annual deforestation in the Baseline Scenario.

Among the identified alternatives, the Project Designer must select and justify the one that represents the most plausible scenario in the absence of the project, considering:

a. Legality (applicable deforestation rights and authorizations);
b. Economic and logistical feasibility;
c. Common practices in the project region;
d. Social, regulatory, and market conditions;
e. Historical evidence of land use and applicable conversion trends.

The Project Designer must present an explicit analysis of the expected trajectory of native vegetation conversion and the projected annual deforestation areas applicable to the Baseline Scenario.

The Project Designer must clearly and verifiably describe in the Project Design Document (PDD) the process of identifying alternatives and the justifications for choosing the Baseline Scenario.

6.2 Land Use Conversion Agent

The Land Use Conversion Agent is a person or group of individuals or legal entities who would have legal control, real economic interest, legal backing, and operational capacity to convert the Project Area to another land use in the absence of the project.

An area is considered under legal control if the Land Use Conversion Agent holds a legally demonstrable right to use, manage, or operate it in whole or in part. When the property title belongs to third parties, such control must be proven through a legally binding and enforceable agreement signed with the respective titleholders. In cases where the property does not have a formally established or regularized title, appropriate documentation proving the right to possession must be provided.

The Project Designer must identify the Land Use Conversion Agent responsible for the conversion in the Baseline Scenario, presenting documentary evidence of their legal, technical, and economic capacity for the conversion.

6.3 Reassessment of the Baseline Scenario

The Project Designer must reassess the Baseline Scenario every five years, counted from the Project Start Date.

The Baseline Scenario must be reassessed before the five-year period if legal, regulatory, or normative changes occur that directly affect the possibility of land use conversion in the Project Area.

If the deforestation schedule provided for in the Baseline Scenario has been fully completed before the end of the five-year period, reassessment of the Baseline Scenario is not required.

If the deforestation plan provided for in the Baseline Scenario remains in effect at the time of reassessment, the Project Designer must update the Baseline Scenario, showing the remaining eligible area and the applicable annual area of planned deforestation.

The Project Designer must demonstrate that the remaining eligible area for land use conversion in the Baseline Scenario is sufficient to sustain the annual area of planned deforestation during the remaining period of the deforestation plan.

During the reassessment of the Baseline Scenario, the Project Designer must assess whether relevant changes have occurred in the legal, regulatory, or normative conditions applicable to land use conversion in the Project Area.

When legal, regulatory, or normative changes are identified that may affect the plausibility of the Baseline Scenario, the Project Designer must review the baseline analysis to reflect such changes.

During the reassessment of the Baseline Scenario, the Project Designer must reassess the eligibility criteria applicable to the areas considered in the Baseline Scenario, demonstrating that such criteria remain valid or presenting the necessary updates.

The reassessment of the Baseline Scenario must include, at a minimum, the review of the following elements:

a. Plausibility of the Baseline Scenario;
b. Land Use Conversion Agent;
c. Annual planned deforestation area and area planned for conversion;
d. Stratification (in case there is technical justification to invalidate the original stratification);
e. Reservoirs and emission sources;
f. Aggregated uncertainties;
g. Leakage indicators and estimates;
h. Legal, territorial, and environmental compatibility;
i. Eligibility of areas considered in the Baseline Scenario;
j. Regulatory frameworks that may affect the Baseline Scenario or Project Activities.

7. Project Scenario

7.1 Definition and Rationale of the Project Scenario

The Project Scenario represents the land use and land cover trajectory in the Project Area resulting from the implementation of the Project Activity.

Its definition must include, at a minimum:

a. The activities to be implemented in the Project Area;
b. The actions for prevention and mitigation of leakage;
c. The coherence between the proposed activities and the identified land use conversion agents;

The definition, characterization, and justification of the Project Scenario must be presented in the PDD.

7.2 Project Activity

The Project Activities comprise the set of operational and territorial management measures to prevent the legally permitted deforestation of native vegetation, promoting the maintenance of carbon stocks and the reduction or prevention of GHG emissions.

The Project Designer must describe the Project Activities in a clear, measurable, and verifiable manner, including at least:

a. Detailed description of the activities to be carried out;
b. Geographical location and spatial delimitation of where the activities will be implemented;
c. Periodicity, frequency, and duration of the activities;
d. Parties involved and their respective responsibilities;
e. Performance and management indicators, in accordance with Section 10.2;
f. Implementation schedule for each activity.

The Project Activities must:

a. Be consistent with the identified land use conversion agents;
b. Demonstrate plausible and sustained capacity to alter the trajectory of the Baseline Scenario.

7.3 Leakage Prevention and Mitigation Actions

Leakage Prevention and Mitigation Actions are the set of measures planned and implemented to avoid, reduce, or compensate for the displacement of activities causing GHG emissions outside the Project Area, minimizing the leakage of these emissions.

The Project Designer must identify, describe, and implement measures for the prevention and mitigation of GHG emissions leakage.

The leakage prevention and mitigation measures must be described in the PDD and include, at a minimum:

a. Description of the measures to be implemented;
b. Location and spatial delimitation;
c. Periodicity, frequency, and duration of the actions;
d. Parties involved and their roles;
e. Performance and management indicators, in accordance with Section 10.2;

f. Implementation schedule for each action.

The Project Designer must demonstrate:

a. The mechanisms by which the measures and actions reduce the probability or magnitude of leakage;

b. The direct relationship between the proposed measures and the identified conversion agents;

c. The technical, empirical, or documentary evidence that supports its effectiveness.

8. Additionality

To Demonstrate the additionality of projects eligible under methodology MEEC001: REDD/P Methodology, the Project Designer must apply FEEC002: Tool for Demonstrating Additionality, following the appropriate flow and tests for each project type.

The complete additionality analysis, including all justifications and evidence, must be presented in the PDD.

When the ECORA Carbon Credit Certification Program publishes documentation regarding the standardized additionality approach for methodology MEEC001, the application of the FEEC002 tool may be waived, provided that the Project Designer demonstrates the project's compliance with the eligibility requirements defined by the standardized approach.

9. Quantification of GHG Emission Reductions

9.1 Sources of Emission Factors

Data, emission factors, and conversion parameters are used for the quantification of GHG emissions and removals and must be obtained from transparent, consistent, and verifiable sources, ensuring the lowest degree of uncertainty and methodological consistency between the Baseline Scenario, the project scenario, and the leakage estimate.

Hierarchy of Data Sources

The selection of data sources must follow the following hierarchy of preference:

a. Primary field data, including inventories conducted according to recognized technical protocols appropriate to the type of Project Activity;

b. Regional data obtained from scientific articles indexed in the *SciELO, Web of Science* and *Scopus* platforms. The data must come from a study with a sampling error equal to or less than 20% and with a confidence interval of at least 90%. When the value of the regional data is less conservative than that available in the national inventory officially consolidated by the country where the project is located (for example, average carbon stock value in the aboveground woody biomass reservoir in the Baseline Scenario of the regional data higher than the national inventory data), the Project Designer must use the national inventory data;

c. Data from the officially consolidated national inventory in the country. For projects in Brazil, the Project Designer must use the most recent version of the National Inventory of Anthropogenic Greenhouse Gas Emissions and Removals;

d. Data from the *Guidelines for National Greenhouse Gas Inventories*, from the IPCC.

All data sources used must be referenced, including author, year, publication or database.

Emission Factors and Conversion Parameters

Emission factors and conversion parameters are coefficients used to convert activity data or field data (for example, area in hectares, wood volume in m^3, biomass, wood density or average height) into estimates of GHG emissions or removals, expressed in CO_2 equivalent.

Emission factors and conversion parameters must be applied to convert field data (for example, biomass, wood density, height, volume) into GHG emissions or removals.

The conversion of biomass into GHG emissions or removals must follow, when applicable, the following sequence:

a. Conversion of volume into dry biomass;

b. Conversion of biomass into carbon (for example, by means of a conversion factor);

c. Conversion of carbon into carbon dioxide equivalent (CO_2e), using the stoichiometric factor 44/12.

The emission factors and conversion parameters used in the Project Scenario must be the same as those applied in the Baseline Scenario, or demonstrate proven technical equivalence, seeking methodological consistency and avoiding overestimation of emission reductions or removals.

9.2 Baseline Scenario Emissions

Baseline Scenario emissions must be estimated to be comparable to the Scenario with Project Activity, seeking methodological consistency and avoiding biases.

Stratification

When the Project Area presents heterogeneity, the Project Designer must stratify the area into homogeneous strata, each with its own characteristics and spatially delimited according to the guidelines of MOEC001: Carbon Measurement in Vegetation Module.

In case of stratification, the Project Designer must present a georeferenced map containing the delimitation of the defined strata.

The delimited strata must be consistent and maintained coherently between the Baseline Scenario, Scenario with Project Activity, and Monitoring.

In case of stratification in the Project Area, the Project Designer must indicate in the PDD the data sources and technical criteria used for its definition.

Estimation of Emissions in the Baseline Scenario

For the estimation of emissions in the Baseline Scenario, the Project Designer must apply Equation 1:

$$\Delta C_{DesP,LB,e,t} = \sum_{t_d=1}^{t} \left(A_{DesP,LB,e,t_d} * \Delta C_{total,e,(t-t_d+1)} \right) - \Delta C_{Comp,LB,t} \qquad (1)$$

$\Delta C_{DesP,LB,t}$ = Net variation in carbon stock in all reservoirs in the Project Area in the Baseline Scenario for stratum "e" in year "t" (tCO_2e);

A_{DesP,LB,e,t_d} = Annual planned deforestation area in the Baseline Scenario in the Project Area for stratum "e" in year "t_d" (ha);

$\Delta C_{total,e,(t-t_d+1)}$ = Net variation in carbon stock in the Baseline Scenario for stratum "e", applicable to the year after deforestation "t" ($tCO_2e\ ha^{-1}$);

$\Delta C_{Comp,LB,t}$= Net removals of carbon stock associated with the compensation obligation in the Baseline Scenario, in year "t" (tCO_2e);

e = stratum 1, 2, 3 .... n;

t = time in years elapsed since the Start Date of the Crediting Period;

t_d = year of occurrence of deforestation in the Baseline Scenario.

In cases where the planned deforestation in the Baseline Scenario is subject to an obligation that results in carbon removals, such as forest replacement, regardless of geographic location, the net carbon removals resulting from this obligation must be accounted for in the Baseline Scenario and deducted from the net variation in carbon stock, through the variable $\Delta C_{Comp,LB,t}$.

Quantification of the Annual Planned Deforestation Area

In order to determine the emission estimate in the Baseline Scenario, it is necessary to define:

a. Total Planned Deforestation Area: This is the total area defined in the deforestation plan within the Project Area as provided in the documentation that proves compliance with the eligibility criteria for Technical and Environmental Conditions of Planned Deforestation as per Section 4;

b. Annual Planned Deforestation Area (A_{DesP,LB,e,t_d}): This is the area planned to be deforestedper year, in a given stratum, over the Crediting Period. The area must be in accordance with the documentation that proves compliance with the eligibility criteria for Technical and Environmental Conditions of Planned Deforestation (Section 4) and be compatible with the annual reference deforestation area provided by ECORA for the Project Area region.

When the Annual Planned Deforestation Area (A_{DesP,LB,e,t_d}) shown is greater than the annual reference deforestation area provided by ECORA, the Project Designer must present evidence of operational feasibility for its execution, including proof that the Land Use Conversion Agent has the necessary financial, logistical, and technical resources to carry out the deforestation corresponding to the adopted annual planned deforestation area.

The Project Designer must demonstrate that the adopted annual deforestation area is in compliance with the legal deforestation limit of the project's jurisdiction, when applicable.

Quantification of Carbon Stock Variation

The total variation in carbon stock is obtained by summing the variation in carbon in each included reservoir, considering the existing vegetation in the area.

The calculation of the carbon stock of each reservoir must be carried out according to the guidelines of MOEC001: Carbon Measurement in Vegetation Module.

This methodology allows that, in Validation and in the first Verification, the Project Designer uses secondary biomass data to compose the estimates of carbon stocks in the Baseline Scenario following the data hierarchy of Section 9.1. These values can be used both in the *ex-ante* calculation and in the *ex-post* calculation related to the first monitoring period.

From the second Verification onwards, it becomes mandatory to use biomass values determined by forest inventory carried out within the Project Area, according to the requirements established in MOEC001: Carbon Measurement in Vegetation Module.

After the first measurement, updates must be carried out every five years. When there is no occurrence of degradation and/or disturbance in the Project Area, proven by remote sensing analysis and/or sentinel plots, the measurement update will be optional.

In this context, the quantification of emissions must reflect the different temporal trajectories of decomposition, release, and accumulation of carbon in the different reservoirs, accounting for both the initial (pre-deforestation) and post-deforestation conditions.

For calculation purposes, carbon stocks are estimated separately by reservoir, including above- and below-ground biomass, non-woody biomass, litter, dead wood, wood products, and soil organic carbon, according to the specific rules defined below. For the calculation of post-deforestation conditions, secondary data may be used.

Aboveground Woody Biomass

a. Initial condition

It is assumed that the soil is completely cleared of its native vegetation, resulting in the loss and immediate emission of all biomass stock during the first year.

b. Post-deforestation conditions

It is assumed that carbon gain should be modeled according to subsequent land use:

For pastures and annual crops, it should be assumed that the carbon stock reaches a steady state during the first year after conversion (t_d).

For perennial crops, carbon gain should be modeled gradually from year t_d until the end of the crop's growth cycle.

Belowground Woody Biomass

a. Initial conditions

It is assumed that carbon is gradually released over 10 years, considering the annual emission of 1/10 of the initial stock between years t_d and t_d+9.

b. Post-deforestation conditions

It is assumed that carbon gain should be modeled according to subsequent land use:

For pastures and annual crops, it should be assumed that the carbon stock reaches a steady state during the first year after conversion (t_d).

For perennial crops, the carbon gain should be modeled gradually from year t_d until the end of the crop's growth cycle.

Non-woody Biomass Above and Belowground

a. Initial conditions

It is assumed that the vegetation is removed during land use conversion, resulting in the immediate emission of 100% of the carbon stock during the first year t_d. When demonstrated through secondary data (according to the requirements of Section 9.1) that this reservoir under initial conditions is not material (carbon stock less than 5% of the sum of the other mandatory reservoirs for the initial conditions included in the project, as per procedures established in Appendix A.), the value may be considered zero.

b. Post-deforestation conditions

For pastures and annual crops, it should be assumed that the carbon stock reaches a steady state during the first year after conversion (t_d).

For perennial crops, the carbon gain should be modeled gradually from year t until the end of the crop's growth cycle.

Litter

a. Initial conditions

It should be assumed that the litter is removed or decomposed rapidly during conversion, resulting in the immediate emission of its carbon stock in year t_d.

b. Post-deforestation conditions

For pastures and annual crops, it should be assumed that the carbon stock reaches a steady state during the first year after conversion (t_d).

For perennial crops, the carbon gain should be modeled gradually from year t_d until the end of the crop's growth cycle.

Dead Wood

a. Initial conditions

It is assumed that carbon is gradually released over 20 years, considering the annual emission of 1/20 of the initial stock between years t_d and t_d+19.

b. Post-deforestation conditions

It should be assumed that dead wood stocks are insignificant in the new land use, unless otherwise technically justified.

Soil Organic Carbon

It is assumed that the soil organic carbon stock varies linearly between pre- and post-deforestation conditions over a period of 20 years, between years t_d and t_d +19.

This variation occurs linearly and may represent either a reduction or an increase.

Wood Products

a. Initial conditions

Wood products derived from vegetation conversion should be classified according to their durability and decomposition dynamics. For the short-duration class, such as harvest residues, firewood, and charcoal, it should be assumed that the carbon is released instantly in year t_d, due to the rapid decomposition or burning of these materials. For the medium-duration class, such as sawn wood, panels, furniture, and other products used in temporary applications, it should be assumed that the carbon is released gradually over a period of 20 years, through linear decay, with emissions distributed evenly between years t_d and t_d +19. For the long-duration class, products that release CO_2 into the atmosphere after a period of 20 years are included, such as wooden structures in buildings, bridges, and other construction wood products with usage exceeding the analysis time horizon.

b. Post-deforestation conditions

It is assumed that carbon stocks in wood products are always insignificant (i.e., the stock is considered zero).

Estimation of Carbon Stock Variations

The carbon stock variations in the Baseline Scenario (ΔC_{total}) for each reservoir must be estimated by the difference between the existing stock under initial conditions and the remaining stock after deforestation.

Stock changes must be calculated for each reservoir in each stratum using Equation 2:

$$\Delta C_{total,LB,e,a} = \sum_r \left(\frac{C_{i,r,e}}{H_{i,r}} - \frac{C_{pos,r,e}}{H_{pos,r}} \right) + \Delta C_{PM,LB,e,a} \qquad (2)$$

Where:

$\Delta C_{total,\mathrm{LB},e,a}$ = Variation in total carbon stock in the Baseline Scenario, in stratum “e” applicable to year “a” (tCO2e ha^{-1});

$C_{i,r,e}$ = Carbon stock in reservoir “r” in stratum “e” (tCO_2e ha^{-1}) – MOEC001;

$C_{pos,r,e}$ = Carbon stock after conversion in reservoir “r” in stratum “e” (tCO_2e ha^{-1});

$\Delta C_{PM,LB,e,a}$= Variation of carbon stock in wood products, in the Baseline Scenario, in stratum “e” applicable to year “a” (tCO_2e ha^{-1});

$H_{i,r}$= Time horizon for the release of the initial vegetation carbon stock, for reservoir "r" (years);

$H_{pos,r}$= Time horizon for the release of the post-conversion vegetation carbon stock, for reservoir "r" (years);

r = considered carbon reservoir (BAc, BNL, Ac, SE...);

e = stratum 1, 2, 3 .... n;

a = year after deforestation.

The variation in wood product stock should consider the initial deduction of carbon transferred from aboveground biomass and the gradual emissions over time, according to Equation 3:

$$\Delta C_{PM,LB,e,a} = -\, C_{PM,LB,e} + C_{PM,1,LB,e} + \frac{C_{PM,LB,20,e}}{20} \quad (3)$$

Where:

$\Delta C_{PM,LB,e,a}$= Variation of carbon stock in wood products in the Baseline Scenario in stratum "e" applicable to year "a" (tCO_2e ha^{-1});

$C_{PM,LB,e,a}$= Average carbon stock stored in wood products in the Baseline Scenario from stratum "e" (tCO_2e ha^{-1}) – MOEC001; Applicable only in the year of deforestation. For the other years, this parameter should be considered as zero;

$C_{PM,1,LB,e}$= Average carbon stock stored in short-duration wood products in the Baseline Scenario from stratum "e" (tCO_2e ha^{-1}) – MOEC001;

$C_{PM,20,LB,e}$= Average carbon stock stored in medium-duration wood products in the Baseline Scenario from stratum "e" (tCO_2e ha^{-1}) – MOEC001;

a = year after deforestation;

e = stratum 1, 2, 3 .... n.

Net Carbon Stock Removals Associated with the Compensation Obligation

The net removal of carbon stock associated with the legal compensation obligation must be obtained through Equation 4:

$$\Delta C_{Comp,LB,t} = \sum_{t_c=1}^{t} \sum_{ec=1}^{ec} \left(A_{Comp,LB,ec,tc} * CG_{total,LB,ec,t} \right) \quad (4)$$

Where:

$\Delta C_{Comp,LB,t}$= Net annual removals of carbon stock associated with the compensation obligation in the Baseline Scenario, in year "t" (tCO_2e);

$A_{Comp,LB,ec,tc}$ = Compensation area that would have been implemented in the Baseline Scenario, in the compensation stratum "ec", in year "tc" (ha);

$CG_{total,LB,ec,t}$ = Total annual increment of above- and below-ground carbon from compensation in the compensation stratum "ec", applicable to the year after the implementation of compensation in the Baseline Scenario, in year "t" (tCO_2e ha^{-1} $year^{-1}$);

t = time in years elapsed since the Start Date of the Crediting Period (years);

tc = year of implementation of the compensation in the Baseline Scenario (years);

ec = compensation stratum.

The parameter $C_{ac,LB,ec,tc}$ must be obtained from the data hierarchy presented in section 9.1. The equation for $CG_{total,LB,ec,t}$ follows the logic of annual biomass growth above and below ground from the IPCC (Equation 2.10), adapted for net annual capture values already expressed in carbon.

The total annual carbon increment must be obtained by Equation 5:

$$CG_{total,LB,ec,t} = C_{ac,LB,ec,tc} * (1+R) * \frac{44}{12} \tag{5}$$

Where:

$CG_{total,LB,ec,t}$ = Total annual carbon increment above and below ground of the compensation activity in the compensation stratum “ec”, applicable to the year after the implementation of the compensation in the Baseline Scenario in year “t” (tCO_2e ha^{-1} $year^{-1}$) (secondary data);

$C_{ac,LB,ec,tc}$ = Net annual carbon capture above ground in the compensation stratum “ec”, in the year applicable to the year after the implementation of the compensation in the Baseline Scenario “tc” (tC ha^{-1} $year^{-1}$) (secondary data);

R = root/shoot ratio;

tc = year of implementation of the compensation activity in the Baseline Scenario (years);

ec = compensation stratum.

Unless technically justified otherwise, the annual carbon increment in the year of compensation implementation may be considered zero, being accounted for from the year following implementation.

The total regeneration period considered for the compensation obligation must be defined based on the vegetation typology and the estimated time required for the vegetation to reach the climax successional stage or equivalent ecological condition, according to recognized bibliographic data, applicable to the project context and technically justified by the Project Designer.

Additional GHG Emissions

The Project Designer must quantify and report the net emissions of CO_2e from the burning of fossil fuels, non-CO_2 gases emissions resulting from biomass burning, direct N_2O emissions associated with nitrogen application in alternative land use, and emissions associated with liming, applying the latest version of MOEC003: Module for Quantification of Greenhouse Gas Emissions and Carbon Stock Reductions in accordance with its requirements for activity data and emission factors.

For the total estimate of emission sources, the Project Designer must use Equation 6:

$$E_{GEE,LB,e,t} = E_{CO_2CCF,LB,e,t} + E_{qbio,LB,e,t} + E_{N_2O_{total,LB,e,t}} + E_{CO_{2}{cal,LB\ e,t}} \tag{6}$$

Where:

$E_{GEE,LB,e,t}$ = Greenhouse Gas Emissions in the Baseline Scenario in stratum “e” in year “t” (tCO_2e);

$E_{CO_2CCF,LB,e,t}$ = Net CO_2e emissions from fossil fuel burning in the Baseline Scenario in stratum “e” in year “t” (tCO_2e) – MOEC003;

$E_{qbio,LB,e,t}$ = Greenhouse Gas Emissions due to biomass burning in the Baseline Scenario in stratum "e" in year "t" for each GHG (CH_4 and N_2O) (tCO_2e) – MOEC003;

$E_{N_2O_{total},LB,e,t}$= Total N_2O emissions resulting from nitrogen application in the Baseline Scenario in stratum "e" in year "t" (tCO_2e) – MOEC003;

$E_{CO_{2\,cal},LB,e,t}$= CO_2e emissions from liming in the Baseline Scenario in stratum "e" in year "t" (tCO_2e) – MOEC003;

e = stratum 1, 2, 3 .... n;

t = time in years elapsed since the Start Date of the Crediting Period.

Estimation of Net Emissions in the Baseline Scenario

The net GHG emissions of the Baseline Scenario for planned deforestation correspond to the total variation in carbon stocks that would occur over time and among the different vegetation strata, added to the additional Greenhouse Gas emissions generated by deforestation processes and subsequent land use.

The Project Designer must determine the variation in carbon stocks using Equation 7:

$$\Delta C_{LB,t} = \sum_{e=1}^{n}\left(\Delta C_{DesP,LB,e,t} + E_{GEE,LBe,t}\right) \tag{7}$$

Where:

$\Delta C_{LB,t}$= Net GHG emissions in the Project Area in the Baseline Scenario in year "t" (tCO_2e);

$\Delta C_{DesP,LB.e,t}$ = Net variation in carbon stock in all reservoirs in the Project Area in the Baseline Scenario in stratum "e" in year "t" (tCO_2e);

$E_{GEE,LB,e,t}$= Greenhouse Gas Emissions in the Baseline Scenario in stratum "e" in year "t" (tCO_2e);

e= stratum 1, 2, 3 .... n;

t = time in years elapsed since the Start Date of the Crediting Period.

Projects that initially used secondary data must replace these values with primary estimates and recalculate the emissions for the period already verified in the Baseline Scenario. Projects that use primary data from the beginning do not need adjustments, except in cases of baseline revalidation, when the inventory must be updated.

The replacement of biomass values implies updating the emissions in the Baseline Scenario of the previously verified period, allowing identification of whether the use of secondary data resulted in underestimation or overestimation of emissions.

When the inventoried values result in emissions in the Baseline Scenario higher than those originally reported, this characterizes underestimation, and the corresponding volume of unaccounted reductions must be added to the total determined in the subsequent verification.

When the inventoried values result in emissions lower than initially estimated, this constitutes overestimation, and the excess volume of credits previously issued must be deducted in the following period. In both cases, the adjustment must be complete, promoting temporal consistency, accuracy, and transparency in the calculation of emission reductions.

All adjustments resulting from the replacement or update of biomass values must be documented in the Monitoring Report and Verification Report, including the technical justification, the comparison between previously used and updated values, as well as the demonstration of the positive or negative adjustment applied.

9.3 Project Scenario Emissions

Stratification

The *ex-ante* defined stratification must remain unchanged throughout the Crediting Period, except when natural events, significant anthropic changes, or justified technical advances render the original stratification unrepresentative of the initial observed conditions.

During the Crediting Period, strata may be updated in response to:

a. Unexpected disturbances (e.g., fires, pests, diseases);

b. Illegal degradation;

c. Changes that invalidate the original reason for maintaining a given stratum.

Any update or change in stratification must be documented, technically justified, and reported in the next Monitoring Report (MR), promoting traceability and methodological consistency.

Estimation of Project Scenario Emissions

Net GHG emissions in the Project Scenario must be calculated using Equation 8:

$$\Delta C_{CP,t} = \sum_{t=1}^{t} \sum_{e=1}^{n} (\Delta C_{Des,CP,e,t} + \Delta C_{Deg,CP,e,t} + E_{GEE,CP,e,t}) \quad (8)$$

Where:

$\Delta C_{CP,t}$= Net GHG emissions in the Project Scenario in year "t" (tCO_2e); $\Delta C_{Des,CP,e,t}$ = Net variation in carbon stock resulting from deforestation in the Project Area in stratum "e" in year "t" (tCO_2e);

$\Delta C_{Deg,CP,e,t}$= Net variation in carbon stock resulting from degradation in the Project Area in stratum "e" in year "t" (tCO_2e);

$E_{GEE,CP,e,t}$= Greenhouse Gas Emissions resulting from activities within the Project Area in stratum "e" in year "t" (tCO_2e);

e = stratum 1, 2, 3 .... n;

t = time in years elapsed since the Start Date of the Crediting Period.

Deforestation

Deforestation in the Project Area corresponds to the conversion of native vegetation to another land use during the monitoring period.

The net variation in carbon stock resulting from deforestation in the Project Scenario must be calculated using Equation 9:

$$\Delta C_{Des,CP,e,t} = A_{Des,CP,e,t} * \Delta C_{total,CP,e} \tag{9}$$

Where:

$\Delta C_{Des,CP,e,t}$ = Net variation in carbon stock resulting from deforestation in the Project Area in stratum “e” in year “t” (tCO_2e);

$A_{Des,CP,e,t}$ = Area of deforestation recorded in the Project Scenario by stratum “e” in year “t” (ha);

$\Delta C_{total,CP,e}$ = Net variation in carbon stock, in the Project Scenario, for stratum “e” (tCO_2e);

e = stratum 1, 2, 3 .... n;

t = time in years elapsed since the Start Date of the Crediting Period.

The Project Designer must identify, delimit, and quantify the deforestation area ($A_{Des,e,t}$), according to procedures established in Appendix B.

For *ex-ante* estimation purposes, the deforestation area recorded in the Project scenario in year “t” ($A_{Des,e,t}$) should be estimated as 10% of the annual planned deforestation area for the Baseline Scenario ($A_{DesP,LB,e,t}$).

Carbon stock changes must be calculated for each reservoir in each stratum using Equation 10:

$$\Delta C_{total,CP,e} = \sum_{r} \left(C_{i,r,e} - C_{pos,r,e} \right) - C_{PM,>20,CP,e} \tag{10}$$

Where:

$\Delta C_{total,CP,e}$ = Variation in total carbon stock in the Project Scenario, in stratum “e” ($tCO_2e\ ha^{-1}$);

$C_{i,r,e}$ = Carbon stock in reservoir “r” in stratum “e” ($tCO_2e\ ha^{-1}$) – MOEC001;

$C_{pos,r,e}$ = Carbon stock after conversion in reservoir “r” in stratum “e” ($tCO_2e\ ha^{-1}$);

$C_{PM,>20,CP,e}$= Average carbon stock stored in long-duration wood products in the Project Scenario from stratum “e” ($tCO_2e\ ha^{-1}$) – MOEC001;

r = considered carbon reservoir (BAc, BNL, Ac, SE...);

e = stratum 1, 2, 3 .... n.

Degradation

Degradation in the Project Area corresponds to losses of carbon stock from native vegetation without conversion to another land use during the monitoring period.

The Project Designer must consider:

Planned degradation: occurs as a result of selective logging, carried out legally, proven by environmental licensing for projects in Brazil and by FSC certification for projects outside the country;

Unplanned degradation: may occur as a result of anthropic actions, such as unplanned logging, carried out illegally, for the extraction of trees for timber, firewood, or charcoal, or for land use without its conversion. It may also result from natural causes, such as fires, storms, hurricanes, extreme drought events, or flooding.

The net variation in carbon stock due to degradation in the Project Area must be obtained through Equation 11:

$$\Delta C_{Deg,CP,e,t} = \Delta C_{DegP,e,t} + \Delta C_{DegNP,e,t} \quad (11)$$

Where:

$\Delta C_{Deg,CP,e,t}$= Net variation in carbon stock resulting from degradation in the Project Area in stratum "e" in year "t" (tCO_2e);

$\Delta C_{DegP,e,t}$= Net variation in carbon stock resulting from planned degradation in sustainable forest management areas in the Project Area, in stratum "e" in year "t" (tCO_2e);

$\Delta C_{DegNP,e,t}$= Net variation in carbon stock resulting from unplanned degradation in the Project Area, in stratum "e" in year "t" (tCO_2e);

e = stratum 1, 2, 3 .... n;

t = time in years elapsed since the Start Date of the Crediting Period.

Planned Degradation

The net variation in carbon stock resulting from planned degradation must be obtained by Equation 12:

$$\Delta C_{DegP,e,t} = C_{PM,1,DegP,e,t} + C_{PM,20,DegP,e,t} + C_{cla,e,t} + C_{infra,e,t} \quad (12)$$

Where:

$\Delta C_{DegP,e,t}$ = Net variation in carbon stock resulting from degradation by selective logging in forest management areas in the Project Area in stratum "e" in year "t" (tCO_2e);

$C_{PM,1,DegP,e,t}$= Average carbon stock stored in short-lived wood products resulting from degradation by selective logging originating from stratum "e" in year "t" (tCO_2e) – MOEC001;

$C_{PM,20,DegP,e,t}$= Average carbon stock stored in medium-lived wood products resulting from degradation by selective logging originating from stratum "e" in year "t" (tCO_2e) – MOEC001;

$C_{cla,e,t}$ = Carbon stock reduced by the opening of logging clearings in stratum "e" in year "t" (tCO_2e) – MOEC003;

$C_{infra,e,t}$ = Carbon stock reduced by the construction of logging infrastructure in stratum "e" in year "t" (tCO_2e) – MOEC003;

e = stratum 1, 2, 3 .... n;

t = time in years elapsed since the Start Date of the Crediting Period.

The Project Designer must fully follow MOEC001: Module for Carbon Measurement in Vegetation and MOEC003: Quantification of Greenhouse Gas Emissions and Carbon Stock Reductions Module. For the Project Scenario*,* the average carbon stock stored in long-lived wood products will be fully accounted for in the year of deforestation.

Unplanned Degradation

The Project Designer must consider, for quantification purposes, only the area affected by degradation that overlaps with the Project Area.

The net variation in carbon stock due to degradation must be obtained by Equation 13:

$$\Delta C_{DegNP,e,t} = \sum_{ed=1}^{ed} (A_{DegNP,e,ed,t} * \Delta C_{DegNP,area,e,ed,t}) \quad (13)$$

Where:

$\Delta C_{DegNP,e,t}$ =Net variation in carbon stock resulting from unplanned degradation in year “t” (tCO_2e);

$A_{DegNP,e,ed,t}$= Area impacted by degradation in the Project Scenario, in the post-degradation stratum “ed”, within stratum “e” in year “t” (ha);

$\Delta C_{DegNP,area,e,ed,t}$= Net variation in carbon stocks per area resulting from degradation in the Project Scenario, in the post-degradation stratum “ed” within stratum “e” in year “t” (tCO_2e ha^{-1});

e = stratum 1, 2, 3 .... n;

ed = post-degradation stratum 1, 2, 3 .... n;

t = time in years elapsed since the Start Date of the Crediting Period.

The Project Designer must identify, delimit, and quantify the areas impacted by unplanned degradation ($A_{DegNP,e,t}$), according to procedures established in Appendix B. Each identified impacted area must constitute a new stratum for emission accounting purposes, being subject to specific quantification of remaining carbon stocks and corresponding GHG emissions.

The net variation in carbon stock resulting from unplanned degradation must be obtained by Equation 14:

$$\Delta C_{DegNP,area,e,ed,t} = \sum_{r} (C_{i,r,e} - C_{pos,DegNP,r,e,ed}) \quad (14)$$

Where:

$\Delta C_{DegNP,area,e,ed,t}$ = Net variation in carbon stocks per area resulting from unplanned degradation in the Project Scenario, in the post-degradation stratum “ed” within stratum “e” in year “t” (tCO_2e ha^{-1});

$C_{i,r,e}$ = Carbon stock in reservoir “r” in stratum “e” (tCO_2e ha^{-1}) – MOEC001;

$C_{pos,DegNP,e,ed}$ = Carbon stock in reservoir “r” in the post-degradation stratum “ed” within stratum “e” (tCO_2e ha^{-1}) – MOEC001;

e = stratum 1, 2, 3 .... n;

ed= post-degradation stratum 1, 2, 3 .... n;

t = time in years elapsed since the Start Date of the Crediting Period.

It is conservatively assumed that all carbon loss in the Project Scenario occurs instantaneously in the same year “t” as the unplanned degradation, with no temporal distribution of emissions over multiple years.

To determine the remaining carbon stock in the post-degradation stratum “ed”, the Project Designer must carry out field inventories in the impacted area, following the measurement procedures established in MOEC001: Carbon Measurement in Vegetation Module.

Additional GHG Emissions

The additional GHG emissions in Project Scenario refer to emissions that occur within the project boundaries but are not included in the calculation of carbon stock variation (ΔC).

The quantification of additional emissions must be carried out considering exclusively the emission sources and types of gases identified as applicable to the Project Scenario, according to the criteria established in Table 2. Emissions from the selected sources must be estimated according to Equation 15:

$$E_{GEE,CP,e,t} = E_{CO_2CCF,CP,e,t} + E_{qbio,CP,e,t} + E_{N_2O_{total.CP\ e,t}} + E_{CO_{2\,cal,CP,e,t}} \tag{15}$$

Where:

$E_{GEE,CP,e,t}$= Greenhouse Gas Emissions resulting from activities within the Project Area in stratum “e” in year “t” (tCO_2e);

$E_{CO_2CCF,CP,e,t}$ = Net CO2e emissions from the burning of fossil fuels resulting from activities within the Project Area in stratum “e” in year “t” (tCO_2e) – MOEC003;

$E_{qbio,CP,e,t}$= Greenhouse Gas Emissions due to biomass burning resulting from activities within the Project Area in stratum “e” in year “t” of each GHG (CH_4 and N_2O) (tCO_2e) – MOEC003;

$E_{N_2O_{total.CP\ e,t}}$= Total N_2O emissions resulting from nitrogen application from activities within the Project Area in stratum “e” in year “t” (tCO_2e) – MOEC003;

$E_{CO_{2\,cal,CP,e,t}}$= CO_2e emissions from liming of Project in stratum “e” in year “t” (tCO_2e) – MOEC003;

e = stratum 1, 2, 3 .... n;

t = time in years elapsed since the Start Date of the Crediting Period.

For the calculation of the variables in Equation 15, the Developer must apply the most recent version of MOEC003: Quantification of Greenhouse Gas Emissions and Carbon Stock Reductions Module, following the specified requirements regarding activity data and applicable emission factors.

9.4 Leakage

Leakage is GHG emissions that occur outside the Project Area, as an indirect consequence of the implementation of the Project Activity. This happens because the protection of native vegetation can displace economic activities and land use pressures to other areas.

For this methodology, leakages are classified as Activity Displacement Leakage and Market Effect Leakage, and must be identified, quantified, and deducted from net GHG emission reductions.

Activity Displacement Leakage

Activity Displacement Leakage occurs when the Land Use Conversion Agent who, in the absence of the project, would carry out activities within the Project Area (such as pasture clearing, agricultural expansion, or timber extraction), transfers these practices to external areas, resulting in additional GHG emissions outside the project boundaries.

The Project Designer must:

a. Identify and characterize the Land Use Conversion Agent considered in the Baseline Scenario;
b. Delimit the Potential Leakage Areas (PLA) to which the Land Use Conversion Agent could transfer their activities planned in the Baseline Scenario.

Potential Leakage Area (PLA) is the portion of Native Vegetation area outside the project boundaries to which deforestation could be indirectly displaced as a consequence of Project Activities. The areas can be estimated by remote sensing, or based on the acquisition of secondary data from reliable sources, such as government databases, and must be delimited, georeferenced, and presented in the PDD.

All areas located outside the Project Area under legal control (including ownership and/or full or partial possession of the property) of the same Land Use Conversion Agent identified in the Baseline Scenario, as per Section 6.2, must be considered as PLA.

For areas under the control of the Land Use Conversion Agent, the following must be accounted for as leakage:

a. For PLA without a deforestation plan approved by the competent authority at the time of project validation: total area of native vegetation deforestation;
b. For PLA with a deforestation plan approved by the competent authority at the time of project validation: deforestation area that exceeds the accumulated area planned up to year "t" to be deforested according to the deforestation plan schedule.

When the PLA has a deforestation plan approved by the competent authority at the time of project validation, the Project Designer must demonstrate, through verifiable evidence, that the Land Use Conversion Agent has the economic capacity to carry out the authorized deforestation and does not depend on the revenue generated by the commercialization of UCEs issued by the project. Otherwise, all deforested area in the PLA must be considered leakage.

If legalized deforestation occurs in the PLA on property whose ownership and/or possession is shared with other independent agents, the area over which the Land Use Conversion Agent had no responsibility and did not benefit directly or indirectly from the deforestation and land use conversion may be disregarded as leakage, provided this is can be proven.

If illegal deforestation occurs in the PLA by an unknown perpetrator, the deforested areas may be disregarded as leakage if the Land Use Conversion Agent formally proves non-responsibility (e.g.: by means of a police report and related official documents).

For the calculation of net leakage emission estimates due to activity displacement, the total potential leakage area and the emission sources resulting from the Leakage of the Project Activity, estimated by Equation 16, must be taken into account:

$$\Delta C_{Vz\ AT,t} = \sum_{e=1}^{n} \left(A_{DesP,Vz,e,t} * \Delta C_{total,Vz,e} \right) + E_{GEE,Vz\ AT,e,t} \tag{16}$$

Where:

$\Delta C_{Vz\ AT,t}$= Net Greenhouse Gas Emissions due to leakage from activity displacement, in the PLA, up to year "t" (tCO_2e);

$A_{DesP,Vz,e,t}$ = Total planned deforestation area from leakage due to activity displacement, in the PLA, for stratum "e" in year "t" (ha);

$\Delta C_{total,Vz,e}$= Net change in carbon stock in the Project Scenario in the PLA, for stratum "e" applicable to the year after deforestation "t" (tCO_2e);

$E_{GEE,Vz\ AT,e,t}$ = Greenhouse Gas Emissions resulting from leakage by displacement of deforestation activities in stratum "e" in year "t" (tCO_2e);

e= stratum 1, 2, 3 .... n;

t = time in years elapsed since the Start Date of the Crediting Period;

The total leakage area from activity displacement ($A_{DesP,Vz,t}$) accumulated over the Crediting Period must be limited to the number of hectares of the Project Area.

When there are no primary data for the biomass of the PLA strata, the Project Designer may use secondary data, according to the data source hierarchy outlined in Section 9.1.

Despite the implementation of Project Activities, the possibility of residual activity leakage is acknowledged, whose magnitude cannot be determined *ex-ante*, and can only be confirmed through *ex-post* monitoring. Given this uncertainty, this methodology adopts a conservative procedure for the *ex-ante* estimate of Leakage from Activity Displacement in the Project Scenario, by applying the Activity Displacement Factor (f_{desloc})) to the annual planned deforestation area.

The value of f_{desloc} must be defined according to the requirements below:

a. 0%, when there is verifiable evidence that there are no PLA to which the Land Use Conversion Agent can transfer its activities;
b. 10% when the Land Use Conversion Agent owns other properties under its legal control (including ownership and/or full or partial possession of the property), with areas of native vegetation subject to deforestation according to current legislation.

At the *ex ante* stage, the Project Designer must apply a f_{desloc} to proportionally represent the risk/propensity of activity transfer, as per the Equation 17:

$$A_{DesP,Vz,t} = A_{DesP,LB,e,t} * f_{desloc} \quad (17)$$

Where:

$A_{DesP,Vz,t}$ = Total planned deforestation area from leakage due to activity displacement *ex-ante* in year "t" (ha);

A_{DesP,LB,e,t_d} = Annual planned deforestation area in the Baseline Scenario in the Project Area for stratum "e" in year "t_d" (ha);

f_{desloc}= displacement factor (%);

e = stratum 1, 2, 3 .... n;

t = time in years elapsed since the Start Date of the Crediting Period.

The Project Designer must document in the PDD the assumptions, data sources, and justifications adopted.

If the Land Use Conversion Agent acquires new areas during the project's Crediting Period, any deforestation of native vegetation in these areas must be monitored and accounted for as potential leakage, in accordance with the linkage requirements of the Land Use Conversion Agent, legal eligibility, and other attribution rules of this methodology.

The total leakage area from activity displacement in the stratum and in year "t" must be obtained through Equation 18:

$$A_{DesP,Vz,t} = \sum_{n=1}^{n} \left(A_{DesP,Vz,obs,n,t} - A_{DesP,Vz,est,n,t}\right) \quad (18)$$

Where:

$A_{DesP,Vz,e,t}$ = Total planned deforestation area from leakage due to activity displacement *ex-post* in year "t" (ha);

$A_{DesP,Vz,obs,n,t}$= Total planned deforestation area observed in PLA "n" in the Project Scenario in year "t" (ha);

$A_{DesP,Vz,est,n,t}$= Total planned deforestation area estimated in PLA "n" in the Baseline Scenario in year "t" (ha);

n = PLA identifier;

t = time in years elapsed since the Start Date of the Crediting Period.

If the total estimated planned deforestation area from leakage due to activity displacement results in a negative value, the Project Designer must disregard the application of the corresponding emissions equation, adopting a value equal to zero for this leakage source.

Stock changes must be calculated for each reservoir in each stratum using Equation 19:

$$\Delta C_{total,Vz,e} = \sum_{r} \left(C_{i,r,e} + C_{pos,r,e} \right) - \Delta C_{PM,>20,Vz,e} \qquad (19)$$

Where:

$\Delta C_{total,Vz,e}$= Net change in carbon stock in the Project Scenario in the PLA, for stratum "e" ($tCO_2e\ ha^{-1}$);

$C_{i,r,e}$ = Carbon stock in reservoir "r" in stratum "e" ($tCO_2e\ ha^{-1}$) – MOEC001;

$C_{pos,r,e}$ = Carbon stock after conversion in reservoir "r" in stratum "e" ($tCO_2e\ ha^{-1}$);

$\Delta C_{PM,>20,Vz,e}$= Average carbon stock stored in long-duration wood products in the PLA from stratum "e" (tCO_2e ha-1) – MOEC001;

r = considered carbon reservoir (BAc, BNL, Ac, SE...);

e = stratum 1, 2, 3 .... n.

Emissions associated with activity displacement must be accounted for as leakage and include, when applicable, those from fossil fuel burning, emissions of non-CO_2 gases resulting from biomass burning, direct N_2O emissions associated with nitrogen application in alternative land use, and emissions associated with liming application, by applying the latest version of MOEC003: Quantification of Greenhouse Gas Emissions and Carbon Stock Reductions Module, as presented in Equation 20:

$$E_{GEE,Vz\ AT,e,t} = \sum_{n=1}^{n} E_{CO_2CCF,Vz,n,t} + E_{qbio,Vz,n,t} + E_{N_2O_{total},Vz,n,t} + E_{CO_2cal,Vz,e,t} \qquad (20)$$

Where:

$E_{GEE,Vz\ AT,e,t}$= Greenhouse Gas Emissions resulting from leakage of deforestation activities, in stratum "e" in year "t" (tCO_2e);

$E_{CO_2CCF,Vz,n,t}$ = Net CO_2e emissions from fossil fuel burning resulting from activities in the Potential Leakage Area, in stratum "e" in year "t" (tCO_2e);

$E_{qbio,Vz,n,t}$= Greenhouse Gas Emissions due to biomass burning resulting from activities in the Potential Leakage Area, in stratum "e" in year "t" of each GHG (CH_4 and N_2O) (tCO_2e);

$E_{N_2O_{total},Vz,n,t}$= Total N_2O emissions resulting from nitrogen application from activities in the Potential Leakage Area in stratum "e" in year "t" (tCO_2e);

$E_{CO_2cal,Vz,e,t}$= CO_2e emissions from liming resulting from activities in the Potential Leakage Area in stratum "e" in year "t" (tCO_2e);

n = PLA identifier;

t = time in years elapsed since the Project Start Date.

The parameters $E_{qbio,Vz,n,t}$, $E_{N_2O_{total},Vz,n,t}$ and $E_{CO_2cal,Vz,e,t}$ must be calculated based on the total planned deforestation area from leakage due to activity displacement *ex-post* ($A_{DesP,Vz,e,t}$).

When there are no primary data for biomass of the PLA strata, the Project Designer may use secondary data to calculate the parameters $\Delta C_{total,Vz,e}$ and $E_{qbio,LB,e,t}$according to the data source hierarchy presented in Section 9.1.

Market Leakage Effect

Market Leakage Effect occurs when the reduction in the supply of timber products within the Project Area is offset by exploitation in other areas, generating additional emissions.

By avoiding the deforestation of native vegetation, the project prevents the wood that would be supplied to the market in the Baseline Scenario from being made available, assuming that this reduction in supply is partially offset by the market through increased production in other areas.

For projects in Brazil, the analysis of market behavior must be carried out by comparing the Immediate Geographic Region of the project, as defined by IBGE, and the behavior observed in the state where the project is located.

The Immediate Geographic Region of the project is adopted as the territorial reference unit as it represents a functional approximation of the project's area of influence, considering that it tends to present similar conditions of vegetation, infrastructure, timber exploitation dynamics, logistics, and market pressure. Thus, for example, when the indicators show that the wood supply in this region is low or not very relevant compared to state-level trends, it is understood that the reduction in supply resulting from the project implementation has a low probability of generating significant pressure on the state timber market.

For projects outside Brazil, a minimum reference of a 50 km buffer around the project perimeter should be considered, unless another technically justified territorial delimitation better represents the local market dynamics.

In the area defined as the Immediate Geographic Region of the project, the Project Designer must assess the leakage indicators B1 — Supply Pressure Index and B2 — Price Pressure Index, as established in Table 3.

For each indicator, the Project Designer must assign scores of 0, 1, or 2, where 0 = low risk, 1 = moderate risk, and 2 = high risk. The assignment of scores, as well as the data sources and evidence used, must be properly justified and documented in the PDD.

Table 3. Criteria, indicators, and notes for defining market leakage in the Immediate Geographic Region

ID	Indicator (weight)	Objective	How to measure	Score 0	Score 1	Score 2
B1	Supply pressure index (50%)	Assess the market dependence on the project's wood volume.	Ratio between the average annual intensity of legally transported wood in the Immediate Geographic Region and the average annual intensity in the state.	IPO > 1.20	0.8 ≤ IPO ≤ 1.2	IPO < 0.80
B2	Price Pressure Index (50%)	Evaluate the ratio of the average wood prices in the Immediate Geographic Region to the state average	Ratio between the average price of m^3 of wood in the Immediate Geographic Region and the average price of m^3 in the state.	IPP < 0.95	0.95 ≤ IPP ≤ 1.10	IPP > 1.10

.

B1 — Supply Pressure Index (IPO): Compares the intensity of legally available wood supply in the market in the Immediate Geographic Region with the average intensity observed in the state.

For projects in Brazil, the estimate of wood volume in the Immediate Geographic Region should be based on the records of issued Forest Origin Documents (DOF) for transport, available in the IBAMA database. The IPO indicates the degree of dependence of the state market on the wood supply in the Immediate Geographic Region and, consequently, the potential risk of leakage due to market effect. When the intensity of wood supply in the Immediate Geographic Region is lower than the state average, the withdrawal of the project's supply would put pressure on the market, increasing the risk of exploitation in other areas.

Classification:

- IPO < 0.80 indicates that the intensity of wood supply in the Immediate Geographic Region is lower than the state average. The withdrawal of this wood puts pressure on the regional market to seek supply in other areas, resulting in a high risk of leakage;
- 0.80 ≤ IPO ≤ 1.20 indicates that the intensity of wood supply in the Immediate Geographic Region is similar to the state average. The reduction in supply is partially absorbed by the market, resulting in a moderate risk of leakage;
- IPO > 1.20 indicates that the intensity of available wood supply in the Immediate Geographic Region is higher than the state average. The withdrawal of the project's supply does not significantly alter the regional market, resulting in a low risk of leakage.

The Supply Pressure Index must be calculated using Equation 21:

$$IPO = \frac{\frac{\overline{V}_{RI,3\ anos,t}}{Área_{RI}}}{\frac{\overline{V}_{UF,3\ anos,t}}{Área_{UF}}} \quad (21)$$

Where:

IPO = Supply Pressure Index (dimensionless);

$\overline{V}_{RI,3\ anos,t}$= Annual average of the volume of wood legally transported in the Immediate Geographic Region over the last three complete years (m^3/year);

$\overline{V}_{UF,3\ anos,t}$= Average of the legally authorized transported volumes in the state over the last 3 complete years (m^3/year);

$Área_{RI}$= Potential Market Leakage Area (ha);

$Área_{UF}$= Total area of the state in which the Project Area is located (ha);

t = time in years elapsed since the Start Date of the Crediting Period.

B2 — Price Pressure Index (IPP): Compares the average price of wood in the Immediate Geographic Region with the state average to identify whether there is abnormal market pressure in that area, that is, whether the price of wood in the Immediate Geographic Region is higher or lower than the state standard.

Classification:

- IPP < 0.95 indicates that the price traded in the Immediate Geographic Region is lower than the state average, suggesting less attractiveness in sales;
- 0.95 ≤ IPP ≤ 1.10 indicates that the price traded in the Immediate Geographic Region follows the state average trend, characterizing moderate market pressure;
- IPP > 1.10 indicates that the price traded in the Immediate Geographic Region is higher than the state average, suggesting a lower relative supply of wood compared to the state market and, consequently, greater associated market pressure in the Immediate Geographic Region.

The IPP must be calculated using Equation 22:

$$IPP = \frac{\overline{P}_{RI,3\ anos,t}}{\overline{P}_{UF,3\ anos,t}} \quad (22)$$

Where:

IPP= Price Pressure Index (dimensionless);

$\overline{P}_{RI,3\ anos,t}$ =Average wood price over the last three years in the Immediate Geographic Region (R$/$m^3$ or U$/$m^3$);

$\overline{P}_{UF,3\ anos,t}$ = Average wood price over the last three years in the project state (R$/$m^3$ or U$/$m^3$);

t = time in years elapsed since the Start Date of the Crediting Period.

The score assigned to each indicator must be combined to obtain the score in the Immediate Geographic Region (S_e), according to Equation 23.

- Calculation of the score in the Immediate Geographic Region (S_e)

The Project Designer must calculate the total score in the Immediate Geographic Region taking into account the respective weights (0.50 and 0.50) of each identifier (B1 and B2).

For the calculation of S_e in the Immediate Geographic Region the Project Designer must apply Equation 23:

$$S_{e,t} = (0{,}50 * B1) + (0{,}50 * B2) \quad (23)$$

Where:

$S_{e,t}$ = Total score value in the Immediate Geographic Region (dimensionless);

$B1$ = Score of identifier B1 (dimensionless);

$B2$ = Score of identifier B2 (dimensionless).

Based on the value of S_e, the Project Designer must determine the Leakage Factor in the Immediate Geographic Region (FV), according to Table 4.

Table 4. Mapping between Score in the Immediate Geographic Region (S_e) and Leakage Factor in the Immediate Geographic Region (FV)

Score S_e	FV
0	0%
0,5	10%
1,0	15%
≥ 1.5	20%

After obtaining the percentage of FV the Project Designer must calculate the market leakage for the project ($\Delta C_{VzEM.t}$), according to the Equation 24:

$$\Delta C_{Vz\,EM.t} = FV_t * (C_{PM,1,LB,e} + C_{PM,20,LB,e} - (C_{PM,1,DegP,e,t} + C_{PM,20,DegP,e,t}) \quad (24)$$

Where:

$\Delta C_{Vz\,EM.t}$ = Net Greenhouse Gas Emissions due to Market Leakage Effects in year "t" (tCO_2e);

FV_t = Leakage Factor in the Immediate Geographic Region, at time "t" (%);

$C_{PM,1,LB,e}$ = Average carbon stock stored in short-duration wood products in the Baseline Scenario from stratum "e" (tCO_2e ha^{-1}) – MOEC001;

$C_{PM,20,LB,e}$ = Average carbon stock stored in medium-duration wood products in the Baseline Scenario from stratum "e" (tCO_2e ha^{-1}) – MOEC001;

$C_{PM,1,DegP,e,t}$ = Average carbon stock stored in short-lived wood products resulting from degradation by selective logging originating from stratum "e" in year "t" (tCO_2e) – MOEC001;

$C_{PM,20,DegP,e,t}$= Average carbon stock stored in medium-term wood products resulting from degradation by selective logging originating from stratum "e" in year "t" (tCO_2e) – MOEC001;

e = stratum 1, 2, 3 .... n;

t = time in years elapsed since the Start Date of the Crediting Period.

Total Leakage

Total emissions due to leakage, including Activity Displacement Leakage and Market Effect Leakage, must be calculated according to Equation 25:

$$\Delta C_{Vz,t} = \Delta C_{Vz\,AT,t} + \Delta C_{Vz\,EM,t} \tag{25}$$

Where:

$\Delta C_{Vz,t}$ = Net Greenhouse Gas Emissions due to Total Leakage in year "t" (tCO_2e);

$\Delta C_{VzAT,t}$ = Net Greenhouse Gas Emissions due to Activity Displacement Leakage in year "t" (tCO_2e);

$\Delta C_{VzEM,t}$ = Net Greenhouse Gas Emissions due to Market Effect Leakage in year "t" (tCO_2e);

t = time in years elapsed since the Start Date of the Crediting Period

9.5 Uncertainty

In REDD/P projects, uncertainties must be identified, quantified, and considered both in the Baseline Scenario and in the Project Scenario, covering, among others, carbon stocks in different reservoirs and associated emissions.

The quantification must strictly follow MOEC002: Uncertainty Quantification Module, which establishes the statistical propagation of individual uncertainties and the combination of the project's total uncertainty.

The sources of uncertainty in REDD/P must include, for the Baseline Scenario and the Project Scenario:

a. Carbon Stock: uncertainties associated with the measurement of different carbon reservoirs, including aboveground and belowground biomass, dead wood, litter, and soil carbon;
b. Forest inventory: plot sampling, DBH/height measurements, selection of allometric equations, and sampling error;
c. Remote sensing: area classification, stratification, change detection;
d. Biophysical parameters: wood density, carbon fraction, root/shoot ratio;
e. Non-CO_2 emission factors: CH_4 and N_2O from burning associated with deforestation.

When the Project Designer uses legal authorizations and deforestation plans as evidence, negligible uncertainty may be assigned to the annual area of planned deforestation provided that:

a. The document presents the authorized deforestation area;
b. Contains valid georeferenced maps considering the level of accuracy required by MOEC002: Uncertainty Quantification Module;
c. Specifies the annual area of planned deforestation or deforestation schedule.

9.6 Non-Permanence Risk

The contribution to the AFOLU Collective Reserve Account corresponds to the fraction of the project's total GHG emission reductions, in year "t", automatically deposited to compensate for possible reversal events in the ECORA Carbon Credit Certification Program.

The retention percentage applicable to the project ($RC_{\%}$) must be determined using FEEC001: Non-Permanence Risk Tool for AFOLU Projects, and the amount retained in the AFOLU Collective Reserve Account is obtained by Equation 26:

$$RC_t = RLT_t * RC_{\%} \tag{26}$$

Where:

RC_t= Retention in the AFOLU Collective Reserve Account in year "t" (tCO_2e);

RLT_t= Total net reductions of GHG emissions in year "t" (tCO_2e);

$RC_{\%}$ = Retention percentage applicable to the project, defined from the Non-Permanence Risk assessment (%) – FEEC001;

t = time in years elapsed since the Start Date of the Crediting Period.

9.7 Net Reductions of GHG Emissions

The total net reductions of GHG emissions from the project in year "t" (RLT_t), correspond to the net result calculated as the difference between the stock changes in the Baseline Scenario and the Project Scenario, with the deduction of leakage effects and the uncertainty adjustment. The value of RLT_t must be calculated using Equation 27:

$$RLT_t = (\Delta C_{LB,t} - \Delta C_{CP,t} - \Delta C_{Vz,t}) * (1 - INC_{ded}) \tag{27}$$

Where:

RLT_t= Total net reductions of GHG emissions in year "t" (tCO_2e);

$\Delta C_{LB,t}$ = Net GHG emissions in the Baseline Scenario in year "t" (tCO_2e);

$\Delta C_{CP,t}$ = Net GHG emissions in the Project Scenario in year "t" (tCO_2e);

$\Delta C_{Vz,t}$= Net GHG emissions due to leakage in year "t" (tCO_2e);

$INC_{ded,t}$ = Uncertainty deduction for project activities in year "t" (%) – MOEC002;

t = time in years elapsed since the Start Date of the Crediting Period.

ECORA Carbon Units (UCEs) eligible for issuance and transaction must be calculated using Equation 28:

$$UCE_t = (RLT_t - RC_t) \tag{28}$$

Where:

UCE_t= Number of ECORA Carbon Units eligible for issuance and transaction for year "t" (UCE);

RLT_t= Total net reductions of GHG emissions in year "t" (tCO_2e);

RC_t= Retention in the AFOLU Collective Reserve Account in year "t" (tCO_2e).

For this methodology, all numerical values used in the quantifications must be rounded conservatively. The values of GHG emission reductions must be rounded down, regardless of the subsequent decimal place.

10. Monitoring and Quality Control

Monitoring and Quality Control aim to establish criteria so that the data and methods used in the project are consistent, traceable, replicable, and auditable throughout the Crediting Period and the Commitment Period.

The ECORA Platform will support the project throughout the Crediting Period, including monitoring and quality control, through digitally automated solutions applicable to these stages.

The Project Designer must establish, implement, and maintain:

a. Monitoring Plan (MP);
b. Quality Management and Control Plan (QMCP).

The MP and QMCP must be described in the PDD and implemented during monitoring. Its application must be demonstrated through evidence in the MR.

The ECORA Platform will provide a digital environment for the development and monitoring of MP parameters and maintenance of the QMCP, integrated with the PDD and MR. The Monitoring Reports issued annually by ECORA will be an additional tool to monitor and anticipate risks between one verification event and another. The availability of monitoring support functionalities will be carried out in stages and will be announced through publications on the ECORA website.

For the preparation of the MP and QMCP, the Project Designer must base them on:

a. Guidelines from consolidated national monitoring;
b. Peer-reviewed scientific literature;
c. IPCC technical documents (including GPG-LULUCF), when applicable.

10.1 Monitoring Plan (MP)

The Project Designer must develop the MP according to the PDD model and it must contain at least:

a. Purpose of monitoring (for example, indicate the objectives, the results to be demonstrated, and the evidence);
b. List of parameters to be measured and monitored;
c. Monitoring frequency as presented in Table 5 and Table 6;
d. Measurement methods, including estimation and modeling approaches;
e. Source and types of data, with their respective units of measurement;
f. Measurement and calculation, considering uncertainty;
g. Recording of monitoring areas by maps.

The monitoring of changes in native vegetation cover must follow the procedures described in Appendix B of this methodology.

Variables and Parameters

The variables and parameters are intended to support the monitoring of the Project Area conditions, as well as changes in carbon stocks and Greenhouse Gas emissions over time.

The Project Designer must consider the variables, including at least:

a. Area of native vegetation converted to other land uses and the associated changes in carbon stocks;
b. Area of native vegetation altered due to degradation and the associated changes in carbon stocks;

c. Areas of native vegetation with loss of carbon stocks resulting from natural disturbances and the associated changes in carbon stocks;

d. Greenhouse Gas emissions associated with project implementation.

Parameters Available in Validation

The Project Designer must, at the time of validation, define the parameters presented in Table 5.

Table 5. Parameters evaluated in the validation of REDD/P projects

Parameter	Description	Unit	Source	Monitoring frequency
$A_{DesP,LB,e,td}$	Annual planned deforestation area in the Project Area in the Baseline Scenario in stratum “e” in year “t_d”	ha	Project Designer	In baseline validation and reassessment
$A_{DesP,Vz,est,n,t}$	Total estimated planned deforestation area in APV “n” in the Baseline Scenario in year “t” (ha)	ha	Project Designer	In baseline validation and reassessment
$C_{BAc,e}$	Average carbon stock stored in aboveground woody biomass in stratum “e”	$tCO_2e\ ha^{-1}$	MOEC001	In baseline validation and reassessment
$C_{BAb,e}$	Average carbon stock stored in belowground woody biomass in stratum “e”	$tCO_2e\ ha^{-1}$	MOEC001	In baseline validation and reassessment
$C_{BNL,Ac,e}$	Average carbon stock stored in aboveground non-woody biomass in stratum “e”	$tCO_2e\ ha^{-1}$	MOEC001	In baseline validation and reassessment
$C_{BNL,Ab,e}$	Average carbon stock stored in belowground non-woody biomass in stratum “e”	$tCO_2e\ ha^{-1}$	MOEC001	In baseline validation and reassessment
$C_{SE,e}$	Average carbon stock stored in litter	$tCO_2e\ ha^{-1}$	MOEC001	In baseline validation and reassessment
$C_{MM,e}$	Average carbon stock stored in dead wood in stratum “e”	$tCO_2e\ ha^{-1}$	MOEC001	In baseline validation and reassessment
$C_{PM,e}$	Average carbon stock stored in wood products in stratum “e”	$tCO_2e\ ha^{-1}$	MOEC001	In baseline validation and reassessment

Parameter	Description	Unit	Source	Monitoring frequency
$C_{PM,1,e}$	Average carbon stock stored in short-duration wood products in stratum "e"	$tCO_2e\ ha^{-1}$	MOEC001	In baseline validation and reassessment
$C_{PM,20,e}$	Average carbon stock stored in medium-duration wood products in stratum "e"	$tCO_2e\ ha^{-1}$	MOEC001	In baseline validation and reassessment
$C_{PM,>20,e}$	Average carbon stock stored in long-duration wood products in stratum "e"	$tCO_2e\ ha^{-1}$	MOEC001	In baseline validation and reassessment
$C_{COS,e}$	Carbon stock stored in soil organic carbon in stratum "e"	$tCO_2e\ ha^{-1}$	MOEC001	In baseline validation and reassessment
$E_{LB,CO_2CCF,e,t}$	Net emissions of CO_2e from the burning of fossil fuels in the Baseline Scenario in stratum "e" in year "t" (tCO_2e)	$tCO_2e\ ha^{-1}$	MOEC003	In baseline validation and reassessment
$E_{LB,qbio,e,t}$	Greenhouse Gas Emissions due to biomass burning in the Baseline Scenario in stratum "e" in year "t" for each GHG (CH4 and N2O)	$tCO_2e\ ha^{-1}$	MOEC003	In baseline validation and reassessment
$E_{LB,CO_2\ cal,e,t}$	CO_2e emissions from liming in the Baseline Scenario in stratum "e" in year "t"	$tCO_2e\ ha^{-1}$	MOEC003	In baseline validation and reassessment
$E_{LB,N_2O_{total,e,t}}$	Total N_2O emissions resulting from nitrogen application in the Baseline Scenario in stratum "e" in year "t"	$tCO_2e\ ha^{-1}$	MOEC003	In baseline validation and reassessment
f_{desloc}	Displacement factor	%		In baseline validation and reassessment
FV_e	Leakage Factor in the Immediate Geographic Region, at time "t"	%	Table 5	Every three years
INC_{ded}	Deduction of cumulative uncertainty for project activities in year "t".	%	MOEC002	At each validation

Parameters for Monitoring

The Project Designer must, at the time of verification, monitor the parameters presented in Table 6.

Table 6. Parameters evaluated in the verification of REDD/P projects

Parameter	Description	Unit	Source	Monitoring frequency
$\boldsymbol{A_{DesNP,CP,e,t_d}}$	Deforestation area recorded in the Project Scenario by stratum "e" in year "t"	ha	Appendix B	Annually
$\boldsymbol{A_{DegNP,e,ed,t}}$	Area impacted by degradation in the Project Scenario, in the post-degradation stratum "ed", within stratum "e" in year "t"	ha	Appendix B	Annually
$A_{DesP,Vz,e,t}$	Total planned leakage deforestation area due to displacement of activities to stratum "e" in year "t"	ha	Project Designer	Annually
$A_{DesP,Vz,est,n,t}$	Total planned deforestation area in the potential leakage area due to displacement of activity "n" in year "t"	ha	Project Designer	Annually
$A_{DesP,Vz,obs,n,t}$	Total observed deforestation area in the potential leakage area due to displacement of activity "n" in year "t"	ha	Appendix B	Annually
$\boldsymbol{C_{clareira,e,t}}$	Carbon stock reduced by the opening of logging clearings in stratum "e" in year "t"	$tCO_2e\ ha^{-1}$	MOEC003	Annually
$\boldsymbol{C_{infra,e,t}}$	Carbon stock reduced by the construction of logging infrastructure in stratum "e" in year "t"	$tCO_2e\ ha^{-1}$	MOEC003	Annually
$\boldsymbol{E_{CP,CO_2CCF,e,t}}$	Net emissions of CO_2e from the burning of fossil fuels in the Scenario with Project Activity in stratum "e" in year "t" (tCO_2e)	$tCO_2e\ ha^{-1}$	MOEC003	Annually
$\boldsymbol{E_{CP,qbio,e,t}}$	Emissions of Greenhouse Gases due to biomass burning resulting from activities within the Project Area in stratum	$tCO_2e\ ha^{-1}$	MOEC003	Annually

Parameter	Description	Unit	Source	Monitoring frequency
	"e" in year "t" of each GHG (CH4 and N2O)			
$E_{CP,CO_2\ cal,e,t}$	Emissions of CO_2e from liming resulting from activities within the Project Area in stratum "e" in year "t"	$tCO_2e\ ha^{-1}$	MOEC003	Annually
$E_{CP,N_2O_{total,e,t}}$	Total N_2O emissions resulting from nitrogen application resulting from activities within the Project Area in stratum "e" in year "t"	$tCO_2e\ ha^{-1}$	MOEC003	Annually
$E_{Vz,CO_2CCF,e,t}$	Net emissions of CO_2e from the burning of fossil fuels in the Project Scenario in stratum "e" in year "t" (tCO_2e)	$tCO_2e\ ha^{-1}$	MOEC003	Annually
$E_{Vz,qbio,e,t}$	Greenhouse Gas emissions due to biomass burning in the Project Scenario in stratum "e" in year "t" of each GHG (CH_4 and N_2O)	$tCO_2e\ ha^{-1}$	MOEC003	Annually
$E_{Vz,CO_2\ cal,n,t}$	Emissions of CO_2e from liming inthe leakage area in stratum "e" in year "t"	$tCO_2e\ ha^{-1}$	MOEC003	Annually
$E_{Vz,N_2O_{total,n,t}}$	Total emissions of N_2O resulting from the application of nitrogen in the Project Scenario in stratum "e" in year "t"	$tCO_2e\ ha^{-1}$	MOEC003	Annually
$RC_{\%}$	Retention percentage applicable to the project, defined based on the Non-Permanence Risk assessment	%	FEEC001	At each verification

10.2 Quality Management and Control Plan (QMCP)

The QMCP establishes the procedures and criteria for quality, integrity, and consistency of the data and methods used in monitoring.

The Project Designer must include, at a minimum:

a. Procedures for reviewing methods, data, and calculations;

b. Verification of input data, spreadsheets, equations, and assumptions to avoid transcription errors and errors in the results presented;

c. Cross-checking results with other data sources, historical records, and peer-reviewed literature to detect discrepancies and obtain reliable results;

d. Identification and treatment of inconsistencies and outliers;

e. System for organization, digital storage, and backup of data;

f. Record of methodological or data changes over time;

g. Document retention and archiving throughout the entire Project Commitment Period.

The Project Designer must adopt internal operational procedures compatible with the QMCP, in order to enable the correct implementation of monitoring activities, and must include, at a minimum:

a. Describe in detail the field procedures, data collection, processing, and consolidation;

b. Present alternative monitoring approaches in case of temporary inaccessibility to project areas (for example, in conflict zones or when there are restrictions on the movement of people) or errors in monitoring equipment or procedures;

c. Present training procedures for the team responsible for field measurements, data collection and analysis, with a record of the scope and date of the training;

d. Indicate technical responsibilities and operational flows;

e. Adopt measurement, sampling, third-party data, or standard value approaches that are robust, statistically representative, or conservative.

References

BARBER, C. P.; COCHRANE, M. A.; SOUZA JR., C. M.; LAURANCE, W. F. Roads, deforestation, and the mitigating effect of protected areas in the Amazon. *Biological Conservation*, v. 177, pp. 203-209, 2014. DOI: 10.1016/j.biocon.2014.07.004.

BRAZIL. Law No. 12,651, of May 25, 2012. Provides for the protection of native vegetation; amends Laws n[os.] 6,938, of August 31, 1981, 9,393, of December 19, 1996, and 11,428, of December 22, 2006; repeals Laws n[os.] 4,771, of September 15, 1965, and 7,754, of April 14, 1989, Provisional Measure No. 2,166-67, of August 24, 2001, and provisions of Law No. 6,015, of December 31, 1973; and provides other measures. *Official Gazette of the Union: section 1*, Brasília, DF, May 28, 2012. Available at: https://www.planalto.gov.br/ccivil_03/_ato2011-2014/2012/lei/l12651.htm. Accessed on: Sep 29. 2025.

BRAZIL. Ministry of the Environment and Climate Change. *Brazilian Amazon Forest Reference Emission Level Submission to the UNFCCC*. Brasília, DF: Ministry of the Environment, 2024. Available at: https://redd.unfccc.int/submissions.html.

BRAZILIAN AGRICULTURAL RESEARCH CORPORATION (EMBRAPA). *Brazilian Soil Classification System.* 6. ed. Brasília, DF: Embrapa Solos, 2018. 590 p.

FAO. Food and Agriculture Organization of the United Nations. *Global Forest Resources Assessment 2020: Terms and Definitions*. Rome: Food and Agriculture Organization of the United Nations, 2020. Available at: https://www.fao.org/forest-resources-assessment.

BRAZILIAN INSTITUTE OF GEOGRAPHY AND STATISTICS. *Technical manual of Brazilian vegetation: phytogeographic system, inventory of forest and grassland formations, techniques and management of botanical collections, procedures for mappings*. 2. ed. Rio de Janeiro: IBGE, 2012. 272 p. ISBN 978-85-240-4272-0.

NATIONAL INSTITUTE FOR SPACE RESEARCH (INPE). *TerraBrasilis - PRODES Project: Monitoring of the Brazilian Amazon Forest by Satellite*. São José dos Campos, Brazil. Available at: https://terrabrasilis.dpi.inpe.br/app/dashboard/deforestation/biomes/legal_amazon/increments.

NATIONAL INSTITUTE FOR SPACE RESEARCH (INPE). *TOPODATA – Geomorphometric Database of Brazil.* São José dos Campos: INPE, 2008–. Available at: https://www.dsr.inpe.br/topodata/.

INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE. *Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*. Edited by Shukla, P. R. et al. Cambridge: Cambridge University Press, 2022. doi: 10.1017/9781009157926.

INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE (IPCC). *2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories. Volume 4: Agriculture, Forestry and Other Land Use. Chapter 2: Generic Methodologies Applicable to Multiple Land-Use Categories.* Geneva: IPCC, 2019. Available at: https://www.ipcc-nggip.iges.or.jp/public/2019rf/vol4.html. Accessed on: 12 Sep. 2025.

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION. *ISO 14064-1:2018 – Greenhouse gases — Part 1: Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals*. Geneva: ISO, 2018.

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION. *ISO 14064-2:2019 – Greenhouse gases — Part 2: Specification with guidance at the project level for quantification, monitoring and reporting of greenhouse gas emission reductions or removal enhancements*. Geneva: ISO, 2019.

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION. *ISO 14080:2018 – Greenhouse gas management and related activities — Framework and principles for methodologies on climate actions*. Geneva: ISO, 2018.

MAPBIOMAS PROJECT. *Annual Series of Land Cover and Land Use Maps of Brazil*. Available at: MapBiomas.

RAISG – Amazon Network of Georeferenced Socio-environmental Information**.** *Amazonia under pressure 2020*. 1. ed. São Paulo: Instituto Socioambiental, 2021. 68 p. ISBN 978-65-88037-07-2.

UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE (UNFCCC). *Report of the Conference of the Parties on its sixteenth session, held in Cancun from 29 November to 10 December 2010: Addendum. Part Two: Action taken by the Conference of the Parties at its sixteenth session.* Bonn: UNFCCC, 2011. (FCCC/CP/2010/7/Add.1). Available at: https://unfccc.int/sites/default/files/resource/docs/2010/cop16/eng/07a01.pdf. Accessed on: 22 Oct. 2025.

Appendix A - Materiality

The methodology adopts quantitative materiality criteria adapted from consolidated CDM practices - *Tool for testing significance of GHG emissions in A/R CDM project activities*.

The Project Designer must apply the significance test to determine which emission sources, carbon reservoirs, and leakage emissions should be included in the quantification of GHG emissions and removals.

The rule must be applied consistently to the Baseline Scenario, Project Activity Scenario, and Potential Leakage Area.

The Project Designer must identify all GHG emission sources and all relevant carbon reservoirs in the Baseline Scenario, Project Scenario, and Potential Leakage Area.

The Project Designer must estimate, in an *ex-ante* manner, the emissions by sources and the reductions in carbon stocks in each identified reservoir as defined in this methodology

The Project Designer must calculate the relative contribution of each source and reservoir in relation to the total project emissions and removals, and must apply Equation 29:

$$C_n = \frac{E_n}{\sum E_n} \tag{29}$$

Where:

C_n = Relative contribution of the tested source or reservoir n (%);

E_n = Emissions or carbon variations from source and/or reservoir n (tCO_2e);

n = Identification index of each source and/or reservoir included in the analysis (e.g. B_{ac}, B_{ab}, MM, SE...);

Based on the result obtained from the relative contribution of each source and reservoir, the Project Designer must order the elements in descending order of relative contribution.

The Project Designer must perform the cumulative sum of the relative contributions, starting from the highest values, until reaching at least 95% of the total.

Classify as not significant the elements not included in the cumulative sum, provided that their total contribution is less than 5% of the project's net GHG emissions.

All exclusions must be justified in the PDD, including data, the calculations of the *ex-ante* estimates, sources used, demonstrating that the exclusion does not result in overestimation of the credits generated.

Appendix B - Monitoring: Detection of Change in Native Vegetation Areas

This Appendix provides guidance to the Project Designer on the monitoring and detection of deforestation and degradation addressed in this methodology.

The assessment in the monitoring of deforestation and degradation of the Project Area must be carried out through remote sensing (except for *in situ* detection in the “Degraded Area” item), following at least the following guidelines:

For satellite images, the following must be presented:

a. Minimum resolution of 30 m x 30 m;
b. Image with a maximum of 10% cloud cover;
c. Multitemporal images must be used to reduce cloud cover to no more than 10%;
d. Pre-processing: the images must undergo geometric correction, atmospheric correction, and radiometric calibration;
e. Identification of the image acquisition date.

For images obtained by aerial survey, the following must be presented:

a. Orthorectified images obtained by Remotely Piloted Aircraft (RPAs) or airplanes;
b. Images with a maximum of 10% shadowing;
c. Flight plan details such as the survey date, percentage of frontal and lateral overlap, and specification of the sensor used.

For satellite and aerial survey images:

a. The images must be comparable between temporal windows, being obtained in the same periods across the years. When possible, periods encompassing the highest photosynthetic activity of native vegetation should be prioritized, for better detection of its coverage;
b. The different strata must be created by visual interpretation or by using computational algorithms. In the case of using computational algorithms, samples from each stratum must be collected, distributed representatively, with subsequent classification of the images.

For the use of secondary databases:

a. The Project Designer must adopt reliable sources, such as government data or data from national and international research institutions;
b. In the case of Brazil, it is recommended to use data such as those from IBGE, INPE, SIMEX, and Mapbiomas.

The areas identified in the monitoring, both for deforestation and for degradation, must be delimited as georeferenced vectors and accompanied by the detection date (or estimated date), extent, and data source.

The remote sensing data source and analysis methods must be specified in the PDD. During the project verification stages, in case of using new sources (e.g. better resolutions, new sensors, etc.) or data closure, the Project Designer must demonstrate compatibility between the old and current data.

Accuracy

The accuracy assessment must be based on visual sampling using satellite or aerial survey images and must include:

a. Use of high-resolution images (≤ 10 meters);
b. Use of probabilistic sampling, preferably stratified, promoting representativeness of all strata;

c. The number of samples per stratum must be defined so as to allow the estimation of accuracy with a confidence level of 90% and a margin of error ≤ ±20%;

d. Construction of a confusion matrix between the sampled points and the classification proposed by the Project Designer.

Based on the confusion matrix, the Project Designer must present:

a. Overall accuracy ≥ 90%;

b. User accuracy ≥ 80%, associated with commission error, which is the error made when assigning a pixel to a stratum when it actually belongs to another stratum;

c. Producer accuracy ≥ 80%, associated with omission error, which occurs when a pixel of the stratum is not mapped correctly;

d. If user and producer accuracy do not reach 80%, depending on the type of vegetation considered, the Project Designer must justify the new value, provided it reaches the minimum threshold of 70%;

e. Confidence intervals and error margins refer to the assessment of statistical uncertainty associated with accuracy metrics and do not alter the minimum values required in items w, x, and y.

The remote sensing data source and analysis methods must be the same during project validation and throughout all Monitoring Periods.

With the strata defined, the Project Designer must produce a thematic map showing the strata and calculate the area of the stratum at time “t”.

Deforested Area

The Project Designer must consider as deforested areas those where a loss of native vegetation cover equal to or greater than 0.5 ha has been identified, observed as a continuous polygon or as a set of contiguous polygons aggregated within the same monitoring time window. For monitoring purposes, the characterization of a deforested area is independent of the identification of the implementation of another land use.

To reduce the risk of underdetection and incentives for fragmentation, the detection procedure must:

a. aggregate (dissolve) contiguous polygons of native vegetation loss within the same monitoring period before applying the 0.5 ha threshold; and

b. explicitly define the treatment of patches <0.5 ha (e.g., classification as degradation/disturbance, with presentation of the criteria, by the Project Designer, for defining these areas, based on reliable data, such as government data or data from national and international research institutions).

The Project Designer must calculate the deforested area for each year, as presented in Equation 30:

$$A_{Des\_Total,e,t} = A_{Des,e,t} - A_{Des,e,t-1} \tag{30}$$

Where:

$A_{Des\_Total,e,t}$= Total deforested area, by stratum, converted to land use, in year “t”; (ha)

$A_{Des,t}$ = Accumulated deforested area, by stratum, converted to land use, in year “t”; (ha)

$A_{Des,t-1}$ = Accumulated deforestation area, by stratum, converted to land use, in year t-1; (ha)

The total deforestation area, once identified, ceases to be part of the Project Area. The polygon of the deforested area must be presented in the Monitoring Report for the respective Monitoring Period.

Degraded Area

Degradation in the Project Area corresponds to losses of carbon stock from native vegetation without conversion to another land use during the monitoring period. Once degradation is detected, a new stratum is formed, according to the guidelines of MOEC001: Carbon Measurement in Vegetation Module.

For the detection of degradation and consequent formation of new strata via remote sensing, the Project Designer must assess changes in continuity or the presence of irregularities and/or patterns in native vegetation cover, indicating selective logging or other activities, together (when possible) with the detection of yards and roads around the areas, not planned in the project. Areas affected by degradation resulting from natural events such as fires, storms, hurricanes, extreme drought events or floods, and landslides occurring during the monitoring period must also be considered.

In the case of *in situ* detection, the degradation points must be georeferenced and the possibility of detecting the degradation by satellite images must be assessed. If the area can be detected by satellite images, the degraded area must be calculated using a Geographic Information System (GIS). If they cannot be seen on satellite images, an estimated degraded area must be established, delimited by a radius of 100 m for each georeferenced point.

The Project Designer must calculate the degraded area for each year, as presented in Equation 31:

$$A_{Deg\_Total,e,t} = A_{Deg,e,t} - A_{Deg,e,t-1} \tag{31}$$

Where:

$A_{Deg\_Total,e,t}$= Total degraded area, by stratum, in year “t” (ha);

$A_{Deg,t}$ = Accumulated degraded area, by stratum, in year “t” (ha);

$A_{Deg,t-1}$ = Accumulated degraded area, by stratum, in year t-1 (ha);